

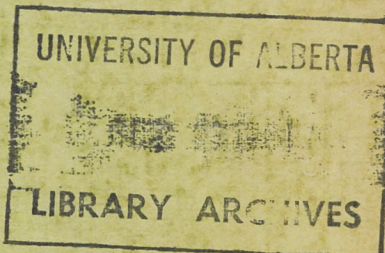


REPORT OF PROCEEDINGS OF THE
SEVENTH ANNUAL CONVENTION
OF THE
WESTERN CANADA
IRRIGATION ASSOCIATION

HELD AT

LETHBRIDGE, ALTA.

August 5, 6 and 7, 1913



Published by authority of the Hon. W. J. Roche, Minister of the Interior

OTTAWA
GOVERNMENT PRINTING BUREAU
1913

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DEPARTMENT OF THE INTERIOR

IRRIGATION BRANCH

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CONTENTS

	PAGE
Previous Conventions.....	6
Officers 1912-13.....	9
Notes for Information of Delegates.....	10
Speakers and Subjects.....	11
Official Programme.....	12
Automobile Journey to D. J. Whitney's Ideal Farm.....	13
Convention Rules.....	21
Interim Resolutions—	
Resolutions from the Cypress Hills Water Users' Association.....	22
Officers 1913-1914.....	24
Tuesday Morning Session, August 5th—	
Address—Hon. A. L. Sifton.....	25
“ His Worship Mayor Hardie.....	27
“ Mr. W. C. Ives.....	27
President's Address.....	29
Address—Mr. R. Needham.....	32
“ Mr. E. Foley-Bennett.....	32
“ Dr. J. G. Rutherford.....	33
“ Mr. W. Young.....	34
“ Prof. R. H. Lyman.....	35
Secretary's Report.....	36
Work accomplished by association during past year.....	36
Dry-Farming Congress, Lethbridge.....	40
Saskatchewan Irrigators form Water Users' Association.....	42
Government Grants.....	44
New York Land Show.....	45
Special Business Meeting of B.C. Delegates.....	45
Address—Hon. Duncan Marshall.....	46
“ Hon. Price-Ellison.....	48
Letter of Regret—Hon. Wm. R. Ross.....	48
Vote of thanks to Hon. Duncan Marshall.....	49
Address—Mr. J. T. Hinkle.....	51
Committee on Credentials named.....	54
“ Resolutions.....	54
Tuesday Afternoon Session, August 5th—	
Address—Mr. E. F. Drake.....	55
“ Dr. J. G. Rutherford.....	64
“ Dr. C. W. Dickson.....	78
“ Mr. James White.....	87
“ Mr. Henry Holmes.....	93
Tuesday Evening Session, August 5th—	
Telegram of Regret—Hon. W. R. Ross.....	94
Address—Mr. H. C. McMullen.....	94
“ Mr. Walter Huckvale.....	103
Executive Meeting.....	108
Financial Statement, Secretary's, 1912-13.....	109
Wednesday Afternoon Session, August 6th—	
Telegrams and Letters of Regret.....	111
Address—Mr. W. H. Fairfield.....	113
“ Mr. J. T. Hinkle.....	120
“ Prof. W. G. Elliott.....	126
Wednesday Evening Session, August 6th—	
Illustrated Lecture by Mr. Armstrong.....	134

	PAGE.
Thursday Morning Session, August 7th—	
Address—Mr. R. H. Campbell.....	134
“ Mr. W. N. Millar.....	141
“ Prof. R. H. Lyman.....	148
Resolutions.....	154
Address—Mr. J. W. Arthur Kelly.....	156
“ Mr. P. E. Quinn.....	162
Report of the Committee of Credentials.....	167
Official Delegates attending Lethbridge Convention.....	167
Place for holding next Convention.....	171
Thursday Afternoon Session, August 7th—	
Election of Officers for 1913-14.....	171
Address—Hon. Duncan Marshall.....	172
Vote of thanks to Hon. Mr. Marshall.....	176
Address—Mr. J. H. Lewis.....	177
Resolutions.....	184
Address—Dr. Allison Smith.....	186
“ Professor A. H. D. Ross.....	189
Communications received.....	198
Adjournment.....	202
Thursday Evening, August 7th—	
Reception and Banquet at Lethbridge Hotel.....	202

ILLUSTRATIONS.

	Page
Galt Park, Lethbridge.....	<i>Frontispiece.</i>
Hon. Duncan Marshall, Minister of Agriculture, Alberta, and President of the Association.....	7
Prominent Members of the Association.....	8
One of the Post Cards used to advertise the Convention.....	12
Prominent Members of the Association.....	16
Collieries at Lethbridge.....	17
Fruit Culture, by means of Irrigation.....	19
One of the Post Cards used to advertise the Convention.....	26
Traffic Bridge, Lethbridge.....	28
Main Business Thoroughfare, Lethbridge.....	28
Delegates from Cypress Hills Water Users' Association.....	31
Delegates attending First Annual Meeting of the Cypress Hills Water Users' Association at Maple Creek.....	31
Delegates to the Convention.....	50
" "	53
Dr. C. W. Dickson, Executive Committee, Kelowna, B.C.....	79
Tobacco Leaf as grown under cheese cloth in Cuba.....	81
Automobile Parade, Lethbridge.....	108
Ladies of St. Cyprian's Anglican Church, who served luncheon at D. J. Whitney's Farm.....	110
Delegates after luncheon at Mr. D. J. Whitney's Farm, Lethbridge.....	110
Mr. D. J. Whitney, owner of the Ideal Farm near Lethbridge.....	112
Cutting Alfalfa near Lethbridge.....	114
Stacking Alfalfa with slings on Government Demonstration Farm, Lethbridge.....	115
Stacking Alfalfa by use of sweeps on Government Demonstration Farm, Lethbridge (2 illustrations).....	117
Irrigation creates Wealth from Water, Sunshine and Soil.....	135
Irrigation Canal at Lethbridge.....	135
A Scene on Henderson Lake, Lethbridge, Alta.....	140
A Sunday Afternoon in Midsummer on Henderson Lake.....	149
The Goulburn—Waranga main ditch, Government of Victoria, Australia.....	159
Some of the Delegates at the Lethbridge Convention.....	169
Some of the ladies attending Lethbridge Convention.....	173
Dethbridge's Water Meter, Irrigation Area, Victoria, Australia.....	181
C.P.R. Viaduct over Belly river, Lethbridge.....	190
One of the Lethbridge Canals.....	195

PREVIOUS CONVENTIONS.

Calgary, Alberta, 1907.

Vernon, British Columbia, 1908.

Lethbridge, Alberta, 1909.

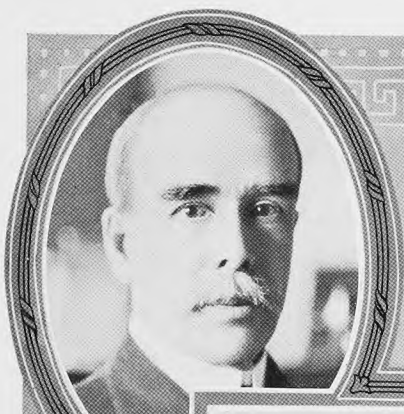
Kamloops, British Columbia, 1910.

Calgary, Alberta, 1911.

Kelowna, British Columbia, 1912.



HON. DUNCAN MARSHALL, Minister of Agriculture, Alberta, and President of the Association.



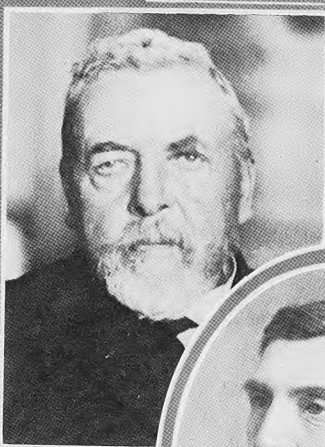
*J.S. Dennis
Vice President*



*W.H. Fairfield, Supt. Dom. Exp. Farm,
Lethbridge, Alberta, Executive Committee.*



*A.S. Dawson,
Executive Committee.*



*W. Pearce,
Executive Committee.*



*Prof. W.J. Elliott, Principal, Provincial
Agricultural School, Olds, Alberta.*



*W.C. Ricardo
Vice President.*

WESTERN CANADA IRRIGATION ASSOCIATION.

OFFICERS FOR THE YEAR 1912-13.

Honorary President—The Honourable G. H. V. BULYEA, Lieutenant-Governor of Alberta, Edmonton, Alberta.

President—The Honourable DUNCAN MARSHALL, Minister of Agriculture, Edmonton, Alberta.

First Vice-President—W. C. RICARDO, Manager Coldstream Ranch, Vernon, British Columbia.

Second Vice-President and Chairman of the Executive Committee—J. S. DENNIS, Assistant to the President, Canadian Pacific Railway, Calgary, Alberta.

EXECUTIVE COMMITTEE.

THOMAS BULMAN, Kelowna, British Columbia.

A. S. DAWSON, Calgary, Alberta.

C. W. DICKSON, Kelowna, British Columbia.

W. J. ELLIOTT, Olds, Alberta.

W. H. FAIRFIELD, Lethbridge, Alberta.

F. J. FULTON, K.C., Kamloops, British Columbia.

J. A. MACKELVIE, Vernon, British Columbia.

WILLIAM PEARCE, Calgary, Alberta.

Permanent Secretary—NORMAN S. RANKIN, P.O. Box 1317, Calgary, Alberta.

LOCAL COMMITTEE.

Arrangements—

W. D. L. HARDIE, Mayor.

W. C. IVES, President Board of Trade.

FRED W. DOWNER, Chairman Entertainment Committee of the Board of Trade.

Local Treasurer—W. H. FAIRFIELD, Superintendent Dominion Experimental Farm.

Local Secretary—W. D. FINLEY, Secretary Associate Boards of Trade of Southern Alberta, 7 Stafford Block.

Official Reporter—H. J. RUSSELL.

PROMPTNESS.

The essence of success in all meetings, excursions and lectures is *promptness*, and as the time is limited it is the desire of the executive that every delegate make the best of it.

RULES.

Rules governing the conduct of the convention will be read by the secretary from the constitution prior to the opening address. Strict compliance with these will expedite business.

NOTES.

Convention Headquarters.—Meetings will be held in the Majestic Theatre, 512 Fifth avenue, south, between Fifth and Sixth streets.

Secretary's Office.—The permanent secretary's headquarters are in room 19, Lethbridge Hotel.

Registration.—Delegates are requested to register at the office of the secretary on arrival and at the Majestic Theatre during the convention hours.

Railway Certificates.—Holders of standard railway certificates will present them to the secretary or his assistant at the office of the secretary, room 19, Lethbridge Hotel, or at the Majestic Theatre during the convention hours.

Badges.—The secretary will issue a badge to each delegate upon registering, and it should be worn conspicuously during the convention to enable the chairman to recognize properly accredited delegates. An additional badge of a distinguished colour will also be worn by each executive.

Admission.—There will be no charge for admission to any session of the convention, and the public is cordially invited to attend. Farmers are especially invited to all sessions and to participate in the discussions. The lower floor of the theatre will be reserved for delegates and farmers, the boxes for distinguished guests and speakers and the balcony for the public.

Privileges.—A special invitation will be extended to all delegates upon registration, to the Chinook club and the Young Men's Christian Association. Street car passes will be provided every accredited delegate, and all are requested to make tours of Lethbridge, visiting such points of interest as the High Level Bridge, the Municipal Mine, the Municipal Power Plant, Galt Gardens, Adams Park, North Lethbridge, Henderson Park and Lake, Dominion Experimental Farm, the Coal Mines, Public School buildings and the Canadian Pacific Railway Company's Irrigation Ditch to the east and southeast.

SPEAKERS.

His Honour G. H. V. Bulyea, Lieutenant-Governor of Alberta.

Hon. Arthur L. Sifton, Premier, Edmonton, Alberta.

Hon. Price Ellison, Minister of Finance and Agriculture of British Columbia, Victoria, British Columbia.

Hon. W. R. Ross, Minister of Lands of British Columbia, Victoria, British Columbia.

Hon. W. R. Motherwell, Minister of Agriculture of Saskatchewan, Regina, Saskatchewan.

Arthur Hooker, Secretary International Irrigation Congress, Spokane, Washington.—*The Work of the International Irrigation Congress.*

R. H. Lyman, Professor of Engineering, University of Utah, Salt Lake City, Utah.—*Irrigation Practice in Utah.*

L. O. Armstrong, former Industrial Commissioner Canadian Pacific Railway, Montreal, Quebec.—*The West of Pioneer Days.* Illustrated with moving pictures.

Dr. J. G. Rutherford, Superintendent Agricultural and Animal Industry Branch, Canadian Pacific Railway, Calgary, Alberta.—*The Work of the International Institute of Agriculture, Rome, Italy.*

John H. Lewis, State Engineer of Oregon, Salem, Oregon.—*Irrigation Practice in Oregon.*

Walter Huckvale, Official Representative Cypress Hills Water Users Association, Maple Creek, Saskatchewan.—*The Irrigation Farmer.*

J. T. Hinkle, Secretary Oregon Irrigation Congress, Hermiston, Oregon.—*Colonization and the Irrigator.*

W. H. Fairfield, Superintendent Dominion Experimental Farm, Lethbridge, Alberta.—*The Culture of Alfalfa in Western Canada.*

J. S. Dennis, Assistant to the President Canadian Pacific Railway, and Chief of Natural Resources Department, Calgary, Alberta.—*Irrigation and Immigration.*

James White, Secretary Commission of Conservation, Ottawa, Ontario.—*Conservation and Irrigation.*

W. N. Millar, District Inspector of Forest Reserves, Calgary, Alberta.—*The Rocky Mountain Forest Reserve.*

E. F. Drake, Superintendent of Irrigation, Department of the Interior, Ottawa, Ontario.

W. J. Elliott, Dean of Provincial Agricultural School, Olds, Alberta.—*Government Education Along Irrigation Lines.*

R. H. Campbell, Director of Forestry Branch, Department of the Interior, Ottawa, Ontario.—*Forestry and Irrigation.*

J. W. Arthur Kelly, Commissioner for Victoria, Australia.—*Irrigation and Land Settlement in Australia.*

A. H. D. Ross, Professor of Forestry, Toronto University, Toronto, Ontario.—*Beautifying the Farm.*

H. C. McMullen, Commissioner of Live Stock, Canadian Pacific Railway, Calgary.—*Live Stock and Irrigation.*

Dr. C. W. Dickson, Kelowna.—*Tobacco Culture in the Okanagan.*

OFFICIAL PROGRAMME.

Tuesday, August 5.

OPENING SESSION, 9.30 A.M.

9.30.—The delegates will assemble at the Majestic Theatre for the opening session. The Honourable Duncan Marshall, president of the association, will call the meeting to order and will declare the Seventh Annual Convention formally opened.

Prayer—Reverend Canon R. E. Murrell-Wright, M.A., Rector of St. Augustine's Anglican Church.

Singing—'God Save the King,' and 'Oh! Canada'—Delegates.

Music by Alexandra Orchestra—E. F. Preisz, leader.

9.45.—Address: The Honourable Arthur L. Sifton, Premier of Alberta.

10.00.—Address of welcome: W. D. L. Hardie, Mayor.

10.15.—Address of welcome: W. C. Ives, President Lethbridge Board of Trade.

10.30.—President's report: The Honourable Duncan Marshall.

10.45.—Secretary's report: Norman S. Rankin.

11.00.—Selection—Orchestra.

11.05.—Address: The Honourable W. R. Motherwell, Minister of Agriculture of Saskatchewan.

11.25.—Address: The Honourable Price Ellison, Minister of Finance and Agriculture of British Columbia.

11.45.—Address: The Honourable W. R. Ross, Minister of Lands of British Columbia.

12.05.—Address: R. H. Campbell, Dominion Director of Forestry, Ottawa, Ontario.

12.25.—Appointment of committees on Credentials and Resolutions.

Delegates are requested to assemble upon the sidewalk for the taking of an official photograph and to witness a drill by the Lethbridge Fire Department, under Chief William Hardy. An alarm will be given from a special box on the platform by the chairman as the delegates file out of the hall. The firemen will respond with motor equipment from the Central Fire Hall on Second avenue south, 1925 feet distant, with two corners to turn, raise three streams, effect rescue from the roof by ladders, utilize the life net, and perform ladder, coupling and hose running for fifteen minutes.

AFTERNOON SESSION.

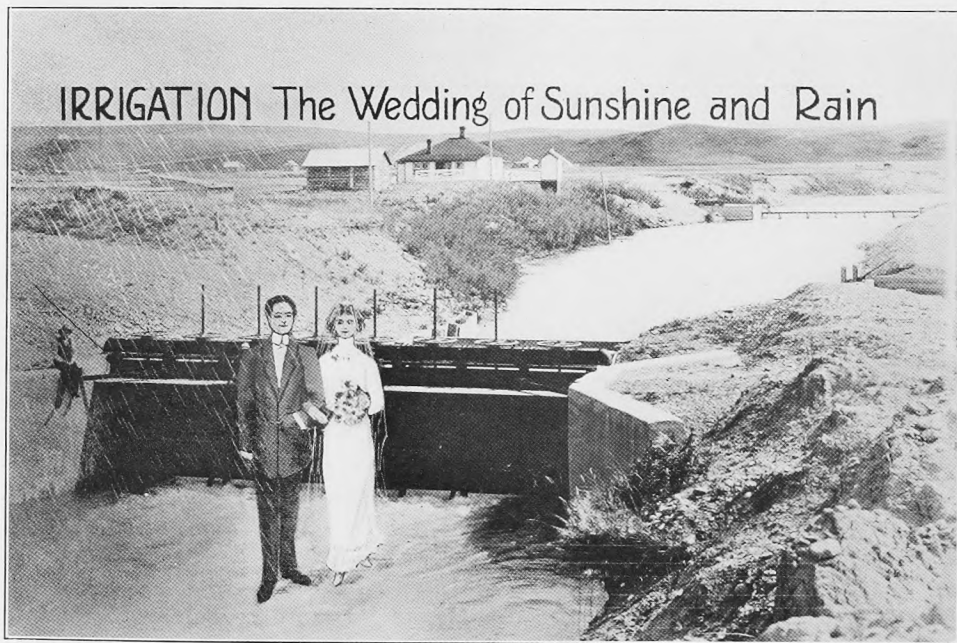
2.30.—E. F. Drake, Dominion Superintendent of Irrigation, Ottawa, Ontario—'The Progress of Irrigation.'

- 3.15.—Dr. J. G. Rutherford, Superintendent of Agricultural and Animal Industry Branch of the Canadian Pacific Railway, Calgary, Alberta—‘The Work of the International Institute of Agriculture, Rome, Italy.’
- 4.00.—Dr. C. W. Dickson, Kelowna, British Columbia—‘Tobacco Culture Under Irrigation Conditions in the Okanagan Valley.’
- 4.45.—James White, Secretary Commission of Conservation, Ottawa, Ontario—‘Conservation and Irrigation.’

EVENING SESSION.

- 8.00.—William Hanley, President Oregon Irrigation Congress, Burns, Oregon—‘Work of the Oregon Irrigation Association.’
- 8.45.—H. C. McMullen, General Live Stock Agent, Canadian Pacific Railway, Calgary, Alberta—‘Live Stock on the Irrigated Farm.’
- 9.30.—Walter Huckvale, Official Representative of the Cypress Hills Water Users’ Association, Maple Creek, Saskatchewan—‘The Irrigation Farmer.’

Throughout all sessions time will be allowed for discussion and the consideration of resolutions.



One of the postcards used to advertise the convention.

Wednesday, August 6.

FARMERS' DAY.

MORNING SESSION OMITTED.

- 9.15.—Delegates will assemble in front of the Natural Resources building, Seventh street, between Second and Third avenues, on the east of Galt Gardens, where automobiles will be taken, for a tour under the auspices of the Lethbridge Board of Trade, Fred. W. Downer in charge. Start will be made prompt at 9.30 a.m.;

destination, Ideal Farm (D. J. Whitney's), via Third avenue, Thirteenth street, Fourth avenue, Fifth street, First avenue, viewing the High Level bridge from a point just south of the approach (with five minutes stop for photographers), Canadian Pacific Railway's Industrial District and Freight Terminals, Thirteenth street north, Hardieville (with ten minutes stop at east of the school-house for official photograph to be taken and permitting a view of all coal mine shafts in the Lethbridge district). Experimental Farm (with one hour allowed for touring the property), Henderson Park Exhibition Grounds, Henderson lake, and south direct to Ideal Farm. A picnic luncheon will be served on the lawn by the ladies of St. Cyprian's Anglican Church. Returning, leave at 1.45 p.m. for the Majestic Theatre, arriving at 2.20 p.m., for the afternoon session.

ITINERARY.

9.30—Starting from in front of Galt Hall (headquarters of the Natural Resources Department of the Canadian Pacific Railway in this city), one of the first buildings of any magnitude built in Lethbridge, erected as a business office and residence of the pioneer mining and developing interests, we turn into Third avenue, on our left passing the Hull Block, built by W. A. Hull, one of the pioneer stockmen of Alberta, who is largely interested financially in the development of Lethbridge and other cities. On the right, facing Galt Gardens, is the Sherlock Block, one of the largest office buildings in the city, owned by Robert E. Sherlock, a pioneer capitalist, while on the right hand corner as we turn is the Royal Bank building. On the left, at the next corner—Eighth street—is the Wesley Methodist Church, recently sold to make way for the advance of mercantile interests, and looking down the street one sees the Canadian Pacific Railway Station, while on the right side of the street some distance down is St. Patrick's Roman Catholic Church, and on the left side of the street is St. Augustine's Anglican Church and rectory. As we continue up Third avenue, going east, we pass a number of fine residences of successful business men, and one block away on the left, extending between Ninth and Thirteenth streets, we observe the machinery and implement district, in which is represented many of the leading concerns in this line on the continent. On the corner of Tenth street, at the right, is Victoria Mansions, a modern family apartment house, and just beside it, on Tenth street, is the new Connaught Mansions, another family apartment house. As we approach Thirteenth street we see ahead the Lumber district, extending for several blocks easterly, and beyond the Oil district, also comprising several blocks. To the left one sees the large flour mills of the Ellison Milling and Elevator Company, with a capacity of five hundred barrels of flour daily, and shipping large quantities to the Orient, and the Taylor Milling and Elevator Company, with a capacity of about one hundred and sixty-five barrels of flour daily.

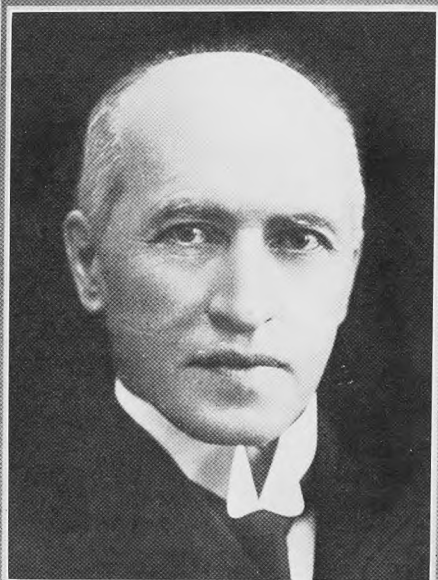
As we turn the corner of Thirteenth street, known locally as Westminster road, and prospectively the centre of the city of the future, we pass the handsome residence and beautiful grounds of Fred. W. Downer, named Westminster House. On the right before we turn into Fourth avenue we pass the residence of C. B. Bowman, one of the pioneer citizens. Turning into Fourth avenue the second house on the right, with large rounding piazza, is the residence of Elias Adams, ex-mayor and pioneer. As we pass the homes of some of the most prosperous citizens our eyes rest upon half a dozen bungalows, Californian in appearance, with English entrance and granolithic fence, and a swinging sign, 'Strathcona Court,' designating these pretty homes. On the right hand corner of Eleventh street is the greenhouse of the Terrill Floral Company, growers of the choicest cut flowers raised in Alberta for the trade of Lethbridge, Calgary and other cities, and on the

next corner the Wesley Methodist Church is under construction at an estimated outlay of \$100,000, finished and furnished, Lethbridge brick and sandstone being used, together with reinforced concrete and steel frame work. Next comes the Young Men's Christian Association building, built of Lethbridge brick, and costing \$80,000 complete, and opposite it, on the left, is the barracks of the Northwest Mounted Police. On the corner of Tenth street the building being erected is St. Patrick's Roman Catholic Cathedral, to be constructed of reinforced concrete, steel frame work and Lethbridge brick and sandstone, and to cost, completed, about \$100,000. Looking up Ninth street past the iron high pressure water tower one sees the new Manual Training School, costing furnished about \$7,500, and beyond it the Central High School, costing \$90,000—modern in every respect and the equal of any school building in western Canada. Approaching Eighth street, on the left is the Alberta Government Telephone Exchange, and on the corner is the Knox Presbyterian Church. At the left, on the corner of Seventh street, the Dominion Government is erecting a post office building, to cost when completed within one year, about \$300,000, and in this, too, Lethbridge-made brick is being used. On the right, surrounded by beautiful grounds, is the home of the Chinook Club, representing an investment of about \$100,000, handsomely furnished and equipped for the comforts of the business men and the club men. Opposite is the Dominion Block, a fine office building, and on the right hand side corner of Sixth street is the Provincial Court House, while just beyond is the home of the Lethbridge *Evening Herald*.

As we turn the corner at the Alexandra Hotel and go north we pass through one of the leading business streets—Fifth street—and note the banks of Toronto, Imperial, Merchants, Union and Commerce (and there are four others in the city, the Molson, Montreal, Royal and Nova Scotia), and then we pass the Lethbridge Hotel and the Hudson's Bay Company's store, turning on to First avenue, and heading west. Crossing the industrial spur track which runs to the wholesale district we see on the left the Union Iron Works and the Lethbridge Brewing and Malting Company's plant, recently increased by the addition of a seven-story building, built of steel and Lethbridge brick, and representing an outlay of \$75,000.

- 9.45.—And here we are at the bridge, for a stop of five minutes to permit of the taking of snapshots. This is the highest-longest viaduct bridge in the world—307 feet from the river bottom and one mile and 47 feet between the bluffs. It represents a total outlay exceeding \$1,000,000. While taking a snapshot of the Belly River Natural Park and bridge have a look at the dark ridge at the water's edge across the coulee and the other one along the edge of the bluff—coal seams, the outcropping of the richest foundation a city can possess. To the left, at the base of the coulee, is the City Power Plant, one of the best equipped for generating electricity in western Canada, the Municipal Coal Mine, producing all the fuel required for the city's utilities, and the sewage disposal plant, a modern filtration system, the whole representing municipal expenditures on a large scale. On the opposite bank, south of the bridge a short distance, may be seen the entrance to the Pioneer mine, owned and operated by James Ashcroft, one of the pioneers of the city, which is producing between 70 and 90 tons of coal daily for local domestic purposes.

We turn from the bridge approach and take the trail to the east up the hill and across the undeveloped property for a distance. At the top we see at the right the big four-story brick Municipal Industrial Plant, equipped for small manufacturers, and with storage facilities for supplies for the municipal utilities, a blacksmith shop, repair shop, &c. On the left we see the yards of the Lethbridge Brick and Terra Cotta Company, which has an



*Hon. Arthur Sifton,
Premier of Alberta.*



*Hon. W.R. Ross,
Minister of Lands, B.C.*



*Hon. W.A. Motherwell,
Minister of Agriculture, Sask.*

output of 10,000,000 brick annually, employing thirty-four hands and having an annual pay-roll exceeding \$28,000.

Passing through the Canadian Pacific Railway Industrial District, on the left the International Harvester Company is constructing a \$125,000 warehouse, while on the right we notice the Ninth street overhead bridge, costing around \$90,000, and beyond the terminals of the Canadian Pacific Railway, where there is being expended this year in improvements upwards of \$265,000, affording facilities for the making of Lethbridge the chief break bulk station west of Moosejaw.

As we turn on to Thirteenth street, and are about to go north, we see at the right the Stacey Lumber Company's yards and in the distance, across the track, the flour milling district we passed a short time ago. Going north we pass the yards of the Pioneer Lumber Company, the Westminster School and Gymnasium—modern educational buildings, representing an outlay above \$70,000—and in the distance at the right is the new high service water tower, 135 feet above the base and with a core eight feet in diameter to supply the water to a tank on the top which is 36 feet in diameter. On the right we pass Adams Park and Playground, named in honour of ex-Mayor Elias Adams, and beyond it is the Galbraith School, costing around \$60,000. We next pass Dominion Square and soon Mine Centre, subdivisions.



Collieries at Lethbridge.

Turning on the trail to the right as we approach the Hardieville school-house, we will stop for ten minutes on the crown of the hill to view the mining district about Lethbridge. From this point every shaft can be seen. To the extreme left, in the direction from whence we came, is No. 3 shaft of the Galt Mines, owned and operated by the Canadian Pacific Railway Company, which last year turned out 131,549 tons of marketable coal, and which for the six months ending June 30 of this year produced 51,850 tons.

Across the coulee and river is the Lethbridge Collieries, having a summer output to-day of 500 tons daily and employing 250 men, and a winter output of 1,500 tons, employing 600 men. This coal is shipped into the territory

from Spokane to Winnipeg, and from the International boundary to Prince Albert, and west on the main line of the Canadian Pacific Railway to Revelstoke and Vernon, in British Columbia.

Next in the view point is No. 6 shaft of the Galt Mines, owned and operated by the Canadian Pacific Railway Company, and the largest producing mine in the district. It had an output of 183,691 tons in 1912, and has produced the first six months of this year, 96,576 tons.

Next one sees the Chinook Collieries, across the river, whose present output is about 350 tons daily under a reduced force, but having a capacity of 700 tons daily maximum. Then comes the Diamond City Collieries, also across the coulee, having a daily output of around 500 tons. We then turn and see the Royal Collieries, now closed down for repairs, with an output of 100 tons daily when in full operation, and adjacent thereto is a smaller mine, the New Barnes, with a daily output of about 20 tons, supplying the farmers and consumers of this vicinity.

These seven mines described employ a total of 2,000 men when in full operation, and have a monthly pay-roll averaging \$155,000, it being at times as high as \$215,000. The properties represent a total investment exceeding \$12,000,000 and a coal acreage in excess of 33,000 acres.

As we resume the trip across the prairie to the east we see the irrigation ditch of the Canadian Pacific Railway Company running north from the Dominion Experimental Farm, which we can see in the distance. In the Lethbridge irrigation district of the Natural Resources Department of the Canadian Pacific Railway there are 251 miles of ditch. The water is taken from the St. Mary river at a point in the Cardston district about five miles north of the International boundary, and in the vicinity of Kimball. The gravity system is used, the water being available for five months in the year up to the full requirements for cultivation. There are practically 60,000 acres under the ditch, which runs through such thriving agricultural districts as Cardston, Magrath, Raymond, Stirling, Wilson, Coaldale, Chin and Lethbridge.

As we turn in towards the Experimental Farm we notice the windbreak of cottonwoods surrounding it, the fields of second crop alfalfa all around and the large stacks of hay that have already been harvested by the farmers of the district, the neat dairy barns, the sleek stock and the well-kept condition everywhere betokening prosperity. As we cross the railroad track we see to the south the Lethbridge Country Club and golf links, and the large brick building to the west is the Provincial Penitentiary. Alfalfa is one of the big crops of this district, and while only a few years ago it was asserted that it could not be grown successfully hereabouts it is noteworthy that the acreage in this district alone this year will exceed 10,000 acres. The large attractive house we approach is the farm home of C. R. Daniels, a successful irrigation farmer, and beyond it the residence of Superintendent Fairfield

11.45 of the Experimental Farm, through whose gates we now turn. One hour will be devoted to a tour of the Farm. The Dominion Government has here 400 acres under cultivation, of which 100 acres are irrigated, the remainder being dry-farmed. A large portion of the land is arranged in plots in the carrying on of tests, experimenting in rotation of crops, and in the cultivation of grains, grasses, fruits and vegetables, with a view to illustrating what good farmers can produce in Sunny Southern Alberta. Here, on one acre last year was produced 757 bushels of potatoes, for example, and on another acre 58 bushels and 59 pounds of wheat, with corn, oats, barley, alfalfa and other products in similar proportion. One of the sights of the moment is the orchard, or rather the two orchards, for there is one dry and one under the

ditch, and in these, interesting experiments are being carried on to produce fruits that are best adaptable to northern climates. Owing to the large number in the party only a brief outline of the work can be given in the time allotted, but at the opening of this afternoon's session Superintendent Fairfield will address the convention on alfalfa. He will be glad to answer questions delegates or farmers submit in writing to the secretary.

12.15.—From the Experimental Farm the route is west and thence south past the greenhouses of Frache Bros., who raise some of the choicest flowers and hot-house vegetables grown in Canada, and thence along the boulevard by Henderson lake to the entrance to Henderson Park, named in honour of the late William Henderson, a former mayor and pioneer, with whom originated the purchase and improvement of this property for the beautifying of the future Lethbridge. This park contains a total of 360 acres, and is owned by



Fruit culture by means of Irrigation.

the city, the exhibition grounds being turned over to an exhibition board for the holding of annual fairs and shows. There are 92 acres covered with water, which is taken from the Canadian Pacific Railway ditch, and the lake is one of the wonders of western Canada. The carrying out of this improvement fell in a large measure to the administration of Mayor George M. Hatch, whose interest in the future of Lethbridge has been most marked and progressive. The boathouses are an innovation of this season, and the boating parties of an evening, with music and dancing, are making the lake a most attractive resort. We head directly south now to the Ideal Farm, the shady nook and pleasant home place of D. J. Whitney, one of the pioneers and one of the first men to attempt forestry on the prairie in this vicinity. Here the ladies of St. Cyprian's Anglican Church have prepared a picnic luncheon on the lawn, which awaits all.

12.20.—Picnic luncheon on the lawn at Ideal Farm.

1.45.—Leave for the return trip direct to the Majestic Theatre, arriving about 2.20 p.m., in time for the opening of the afternoon session at 2.30 p.m.

AFTERNOON SESSION.

- 2.30.—W. H. Fairfield, Superintendent Dominion Experimental Farm, Lethbridge, Alberta—‘The Culture of Alfalfa in Western Canada.’
- 3.15.—John T. Hinkle, Secretary Oregon Irrigation Congress, Hermiston, Oregon—‘Colonization and the Irrigator.’
- 4.00.—Professor W. J. Elliott, Dean of the Provincial Agricultural Schools, Olds, Alberta—‘Government Education Along Irrigation Lines.’
- 4.45.—Report of the Committee on Resolutions.

EVENING.

Special Illustrated Lecture, Bijou Theatre, 428 Fifth Street, near Fifth Avenue.

- 8.15.—L. O. Armstrong, of Montreal former industrial commissioner of the Canadian Pacific Railway, will, through the courtesy of the management of the Bijou Theatre, give an illustrated lecture on ‘The West of Pioneer Days,’ with moving pictures and stereopticon slides. The public are invited to attend.

The executive desire to announce that because the Majestic Theatre is not equipped for moving pictures the offer of the management of the Bijou Theatre was accepted with appreciation in order that all delegates and the public generally may enjoy the very excellent views Mr. Armstrong uses to illustrate his lecture.

Thursday, August 7.

MORNING SESSION.

- 9.30.—W. N. Millar, District Inspector of Forest Reserves—‘The Rocky Mountain Forest Reserve.’
- 10.30.—Professor R. H. Lyman, Professor of Engineering, University of Utah, Salt Lake City, Utah—‘Irrigation Practice in Utah.’
- 11.15.—Arthur Hooker, Secretary International Irrigation Congress, Spokane, Washington—‘The Work of the International Irrigation Congress.’
- 11.45.—J. W. Arthur Kelly, Commissioner for Victoria, Australia—‘Irrigation and Land Settlement in Australia.’
- 12.15.—Report of the Committee on Credentials.

AFTERNOON SESSION.

- 2.30.—John H. Lewis, State Engineer of Oregon, Salem, Oregon—‘Irrigation Practice in Oregon.’
- 3.30.—Professor A. H. D. Ross, Professor of Forestry, Toronto University, Toronto, Ontario—‘Beautifying the Farm.’
- 4.15.—Final Report of the Committee on Resolutions.
- 4.30.—Election of officers and selection of next meeting place.

EVENING.

- 8.30.—Reception to foreign delegates, officers and speakers, tendered by the Mayor and City Council and the Board of Trade, at the Lethbridge Hotel parlours.
- 9.15.—Invitation banquet to foreign delegates, officers and speakers by the Lethbridge Board of Trade at the Lethbridge Hotel. Evening dress.

CONVENTION RULES.

Each morning session shall be called to order at 9.30 a.m., each afternoon session at 2.30 p.m., and each evening session at 8.00 p.m. Morning sessions shall adjourn at 12.30 p.m., unless otherwise ordered by vote of the convention.

All sessions shall open promptly.

Any delegate or other member desiring to speak shall address the chair, and unless called on by name, shall begin by giving his name and place. Communications on subjects not entered in the programme will be limited to five minutes, unless otherwise directed by vote of the convention.

General resolutions, after reading, shall be referred to the Committee on Resolutions without debate, and no general resolution shall be received after the opening of the convention without unanimous consent. Special resolutions relating to the conduct of the association may be read and considered at the discretion of the presiding officer after examination by him.

The time of speakers in general discussion shall be limited to ten minutes, and the time of speakers on questions or resolutions relating to the conduct of the convention shall be limited to five minutes, unless otherwise directed by vote of the convention.

For the convenience of the convention and speakers a bell will ring once three minutes before the close and twice at the close of the time allotted to each speaker on the programme. In the course of discussion and in addresses not entered on the programme, the bell will ring once one minute before the close and twice at the close of the time allotted to the speaker under these rules.

Any speaker rising to address the convention who is in the employ, whether by retainer or otherwise, of any public service corporation which is interested in the action or subjects of deliberation of this convention, shall mention the fact and nature of such employment before proceeding to speak.

INTERIM RESOLUTIONS.

Resolutions from the Cypress Hills Water Users' Association.

Resolution No. 1.—Proposed by W. R. ABBOTT, seconded by R. G. WILLIAMSON:

Whereas, the climate and soil conditions in the Cypress Hills district are extremely varying and are dissimilar in many respects to those found in other districts in the western provinces, and,

Whereas, the conditions of stream flow are peculiar to this district, making irrigation conditions almost completely different to those further west, in Alberta and British Columbia; now, therefore, be it

Resolved, that the Dominion Government be urged to establish a Demonstration Farm at or in the vicinity of Maple Creek, where both irrigation and dry-farming can be practiced, in order that the members of the Cypress Hills Water Users' Association and the dry-farmers in the district may learn the best methods of handling their lands under these conditions.

Resolution No. 2.—Proposed by R. G. WILLIAMSON, seconded by I. H. WILLIAMS:

Whereas, it is the opinion of this convention that irrigation is not carried out in the best manner possible in this district, and,

Whereas, the conditions of stream flow are such that they preclude the possibility of utilizing more than a fraction of the annual flow for irrigation or other purposes, and,

Whereas, the excessive floods cause great damage to both irrigation works and to other interests, and,

Whereas, there are numbers of reservoir sites on the various watersheds in the district which can be utilized to remedy these conditions; therefore be it

Resolved, that the Dominion Government be strongly urged to institute and carry on from year to year such surveys as may be necessary to demonstrate the feasibility of reservoir sites on the various watersheds along which irrigation is practiced and to estimate the capacity and cost of such reservoirs.

Resolution No. 3.—Proposed by I. H. WILLIAMS, seconded by W. X. WRIGHT:

Whereas, there are now over 200 independent irrigation schemes in this district, all of which have business with the department's representatives, and,

Whereas, *practical* advice is frequently required regarding different matters arising in connection with these schemes, and,

Whereas, the irrigation office at Calgary is at such distance as to make it difficult for the majority of the members of this association to visit this office for the purpose of personal discussion of the questions arising; now, therefore, be it

Resolved, that the Minister of the Interior be requested to establish a sub-office of the irrigation department at some central point in this district.

Resolution No. 4.—Proposed by W. X. WRIGHT, seconded by GEO. THOMPSON:

Whereas, our association has been formed to be known as the Cypress Hills Water Users' Association, with a membership of over 200, and,

Whereas, the objects of the association are as outlined in the constitution herewith, and

Whereas, it is considered that the objects of this society are in the public interest, and,

Whereas, the Legislative Assemblies of Alberta and British Columbia made a grant of one thousand dollars (\$1,000) to the Western Canada Irrigation Association last year; now, therefore, be it

Resolved, that the Legislative Assemblies of Alberta and Saskatchewan be requested to make an annual grant to this association for the objects outlined.

Resolution No. 5:

Whereas the proper apportionment of the stream flow in this district to the individual irrigator is a most important question to each member of the association, and,

Whereas, it is recognized that unless some efficient system of supervision be established there will be continual friction amongst the irrigators on the different watersheds, and,

Whereas, it is the opinion of this association that the present system of requiring individual ditch owners to read their own gauge rods is not only working a hardship on the individuals but further is an inefficient method of supervising the use of water, leaving the question wholly at the discretion of the ditch owner; now, therefore, be it

Resolved, that the Commissioner of Irrigation be petitioned to co-operate with the officers of this association to devise some better and more efficient method of carrying out the provisions of the Irrigation Act in this respect.

Resolution No. 6.—Moved by I. H. WILLIAMS, seconded by W. X. WRIGHT:

Whereas, heretofore the Province of Saskatchewan has been neglected in so far as the meetings of the Western Canada Irrigation Association is concerned, and,

Whereas, the irrigators of this district have now organized as the Cypress Hills Water Users' Association, and wish to affiliate with this parent association; now, therefore, be it

Resolved, that this association extends a hearty invitation to the Western Canada Irrigation Association to hold its annual meeting for the year 1915 in the town of Maple Creek.

THE WESTERN CANADA IRRIGATION ASSOCIATION.**OFFICERS FOR THE YEAR 1913-14.**

Hon. President—Hon. W. J. ROCHE, Minister of the Interior.

President—Hon. W. R. ROSS, Minister of Lands for the Province of British Columbia.

Vice-President and Chairman of the Executive—J. S. DENNIS, Assistant to the President, Canadian Pacific Railway.

Second Vice-President—W. H. FAIRFIELD, Superintendent, Dominion Experimental Farm, Lethbridge.

EXECUTIVE.

J. C. DUFRESNE, Vernon, B.C.

Dr. C. W. DICKSON, Kelowna, B.C.

E. FOLEY-BENNETT, Penticton, B.C.

F. J. FULTON, Kamloops, B.C.

D. W. HAYS, Medicine Hat, Alta.

WILLIAM PEARCE, Calgary, Alta.

F. H. PETERS, Calgary, Alta.

W. X. WRIGHT, Battle Creek, Alta.

Permanent Secretary—NORMAN S. RANKIN, Calgary, Alta

NEXT PLACE OF MEETING—PENTICTON, BRITISH COLUMBIA.

REPORT OF THE PROCEEDINGS
OF THE
SEVENTH ANNUAL CONVENTION
OF THE
WESTERN CANADA IRRIGATION ASSOCIATION
HELD AT LETHBRIDGE, ALTA.,
ON
AUGUST 5, 6 and 7, 1913.

OPENING SESSION—TUESDAY, AUGUST 5—9.30 A.M.

The seventh annual convention of the Western Canada Irrigation Association opened in Lethbridge, Alberta, on Tuesday, August 5, at 9.30 a.m.

The chair was taken by the Hon. Duncan Marshall, who, in calling the convention to order, said:—

LADIES AND GENTLEMEN,—I have very much pleasure in declaring the seventh annual convention of the Western Canada Irrigation Association open for business, and will call upon the Reverend Canon Murrell-Wright to lead the convention in prayer.

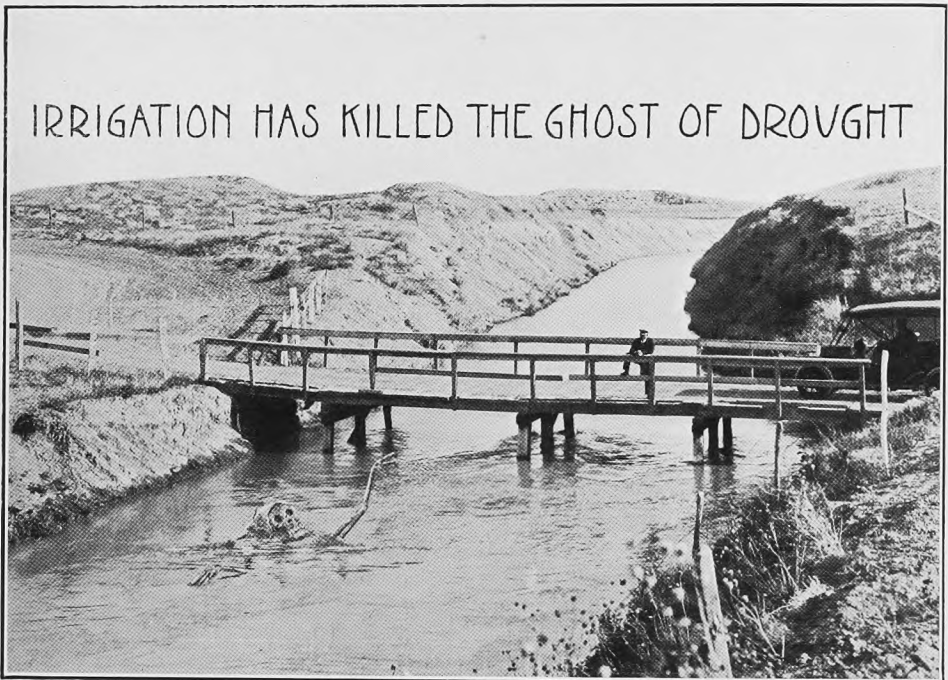
At the conclusion of prayer, the delegates joined in singing ‘God Save the King’ and ‘Oh! Canada.’

CHAIRMAN.—Ladies and gentlemen, I have very much pleasure in now introducing to you the Hon. Arthur L. Sifton, Premier of the Province of Alberta.

Hon. A. L. SIFTON.—Mr. President, ladies and gentlemen, I am very much pleased to have the privilege of being here this morning for a few minutes for the purpose of expressing a welcome from the Province of Alberta, to the delegates from Saskatchewan and British Columbia, and the various delegates who have come here from the countries to the south of us, for the purpose of assisting and learning in connection with the great work that this convention is doing. In this province, as in all the other provinces represented by the delegates that are here, and the various states that may be represented, it has been found that some scientific study of the proper methods of agriculture and the proper method of applying water to the soil is a very great

advantage. During the last few days, I drove from the most northerly terminus of railway communication in this country, or perhaps in any other country, at Athabaska Landing, down 450 miles to the international boundary, and all along that road I find that this year, owing to exceptional conditions, there is in every portion of this country probably the best results to be hoped for that we have had during probably the last twenty years.

This is to a certain extent due to the fact that it has been an exceptional season, but there are portions of this country that at some seasons require the use of irrigation. There are portions of the country that in all seasons can be improved by scientific farming and by the use of the water that Providence has vouchsafed to us in such large quantities, although sometimes it is not placed just where we require



One of the post cards used to advertise the Convention.

it most. I would, therefore, on behalf of the farming community of Alberta, as well as the Government of Alberta, welcome you men here who have devoted your time and attention and are willing to lend a large portion of your time to this work.

The farmers of this, or of any other country, can afford to pay, and pay largely, providing they get the value, but they do not want to pay for water on land that will not grow profitable crops with the benefit of that water, or for water that they are unable to get when it is necessary; and they do not want to pay for water that happens to be absolutely unnecessary, and it is therefore important to every individual farmer who lives in any portion of this country that this irrigation may be, and will be, utilized to the best possible advantage—that they may know of the work you are doing here to-day. It is a great thing to see these three great provinces united

together for this purpose and giving this information to the homesteaders and people who are scattered throughout the length and breadth of this country and who are unable to investigate for themselves. It is very gratifying to know that there are men willing to devote a little extra time and care to this great work in this way, until every acre in this land and throughout the whole country contiguous hereto, will arrive at the utmost fertility, and these plains now supporting 500,000 people where the buffalo formerly ranged will, by the scientific methods adopted by you and others studying these questions, just as easily support 5,000,000 people, who will make happy homes for themselves.

I thank you, Mr. Chairman, for the privilege of being here and of urging you to continue in this great work, and I can say that the people of this province appreciate these hours of study that you are giving to their assistance. (Applause.)

CHAIRMAN.—I now have very much pleasure in introducing to you His Worship Mayor Hardie.

MAYOR HARDIE.—Mr. President, ladies and gentlemen, it is indeed a pleasurable duty to me to be here to-day, but it is also rather embarrassing to find myself a speaker among so many distinguished people. My first duty is not a heavy one, but it is a very pleasurable one, and that is to welcome you to our city and to tell you that while you are here, unless you need the assistance of the police on your own behalf, they will be asleep as far as you are concerned. (Laughter.)

We here in Lethbridge take a great deal of pride in connection with this convention, because as I understand it, many in our district are the fathers of irrigation in Canada, and more especially in western Canada. The days of the opening of the irrigation canal in Lethbridge are very prominent in the minds of all of us who have lived in Lethbridge for less than the last quarter of a century, and we take a great deal of pride in having known the men who projected the scheme and carried on the courageous fight to make a possibility of something that everybody in Alberta can be proud of; in fact, the whole of Canada may be proud of the schemes of irrigation that surround Lethbridge to-day.

Now, ladies and gentlemen, I wish in conclusion to say again that you are thrice welcome to our city. We are glad to see you and will do everything we can to make you comfortable while you are here. (Applause.)

CHAIRMAN.—I have much pleasure in introducing Mr. W. C. Ives, President of the Board of Trade.

MR. IVES.—Mr. President, ladies and gentlemen, I feel a great pleasure in being allowed to add to the words of His Worship the Mayor, a welcome to you to this city. I have only to say that the business community, which I presume is more or less represented by the Board of Trade, fully appreciates that perhaps the chief factor in the upbuilding of this city has been that institution which you, as experts, are here to endeavour to advance. If anything can be done to make your stay here pleasant and comfortable to yourselves, I trust you will feel that you are conferring a favour upon myself and the members of the Board, if you will announce your wishes to us and enable us, so far as we may, to fulfil them. I thank you. (Applause.)



Traffic Bridge, Lethbridge.



Main Business Thoroughfare, Lethbridge.

PRESIDENT'S ADDRESS.

LADIES AND GENTLEMEN.—I am now under the unfortunate and somewhat painful necessity of introducing myself. (Laughter.) As president of this association, I notice that the next item on the programme is an address by the person occupying that position. Unfortunately, I was not present at the last meeting, and consequently was elected. (Laughter.) I don't know who happens to be away to-day, but whoever he is, he will no doubt be elected to the office of president. (Laughter.)

I am very glad indeed to be here, and must thank you delegates for the honour I have received. I am very pleased to see a number of those interested in the problems of irrigation, not only from the Province of British Columbia, which has joined with Alberta during the last six or seven years, but we are glad to welcome a number of delegates from Saskatchewan this year, and I believe there is a movement on foot to extend the work of this association to include the Province of Saskatchewan as well. So, in future, this gathering will be a gathering of the farmers interested in the business of farming by irrigation, not only in Alberta and British Columbia, but in Saskatchewan as well.

I have been pleased to attend one or two meetings of this association in the past. The first was, I think, at Kamloops, in British Columbia, and the next was in Victoria. The first meeting I attended, I was there for four days, and it rained steadily the whole time. (Laughter.) Some opponents of irrigation said the heavens wept for the angels who were sorrowing about the meeting. The next meeting was at Victoria and it snowed about four feet. Most of the delegates spent most of their time explaining that this was really the first snowstorm they had ever had. (Laughter.) I have found communities divided into two camps, familiarly known by the names of the Wets and Drys, and not very long since I attended a large gathering of farmers in this city, at the Dry Farming Congress, where they preached the gospel of dry farming, and I am very glad to be here to-day at the wet farming congress. However, I notice the objects to be attained are much like the objects of most people, and after all, the soul of the science taught at both gatherings will be one and the same thing.

We are very glad to have the Water Users' Association of Maple Creek represented at this convention. The former meetings of this association have been productive of much good, and this is to some extent to the credit of the man who happens to be secretary of this association. (Applause.) It is a common habit with organizations of this kind to meet and pass resolutions. That is a fine and comparatively easy business, but having had a very efficient secretary, these resolutions have not died there, because he has notified the people who were asked by these resolutions to perform certain things or pass legislation. He has not written only once or twice, but he has kept up a continuous correspondence with them, until a great many resolutions have since been crystallized into legislation, particularly in the Province of British Columbia. (Applause.) No doubt many resolutions will be passed at this meeting, and I may say as far as they are concerned I can vote for every one, because in this province the Dominion passes all legislation regarding matters of irrigation, so I will have not the slightest scruple in supporting any resolution that men here who are interested deem it possible to pass. You can count upon my hearty and unanimous support. (Laughter.)

I am very glad to see a feature of the programme of this meeting and that is, that Mr. McMullen, General Live Stock Agent of the Canadian Pacific Railway, is to speak to this gathering on live stock in connection with irrigation. This, I think, is not the first time I have said that no farming is any good without live stock as its basis. I am very glad to know that Mr. McMullen is going to have something to say about the live stock business. I have no notion of attempting to give you a learned dissertation on irrigation, because my department has nothing to do with irrigation laws, but I just want to say one thing and that is, where irrigation can be successfully used in this province it promotes intensive farming and means smaller farms, and the thing that has been to some extent a detriment, has been the operation of very large farms in the provinces of Alberta and Saskatchewan, and the sooner they are cut up the sooner we will have a better class of farming, cleaner land, more money made and better results. Not long ago I addressed a meeting at a town on the Canadian Northern Railway, and I heard a man bitterly complaining, and he said 160 acres was not enough to make a living on, and a neighbour said he perfectly agreed with him that 160 acres of land with eight acres broken was not enough land to farm in this country. I think that is what ails many sections of our country. I have recently driven over a thousand miles in an automobile throughout Alberta, looking at the crops, and the great difficulty we have to contend with, both as to good crops and good farming and the extermination of weeds, is where men are trying to operate far more land than they can handle, with the result that overhead charges are much greater than any possible revenue they can get. I believe that with irrigation, every man who is content to work a quarter or half a section will secure much better results.

Now, ladies and gentlemen, I have no intention of taking up any more of your time. There are a great many serious questions to be considered at this meeting. There was organized, I believe, at the last meeting of the National Irrigation Congress in the United States what is known now as the International Association, and delegates from Canada are to be admitted and welcomed to that. We hope before long to have it meet in our country. In that connection, let me say to the delegates here that while I appreciate the usefulness of conventions where men from all parts may meet together and discuss their respective problems, let me sound a note of warning that this business of calling large conventions has become a kind of a profession, and the result is that some of them have become so expensive that no city cares to handle them; and one city has turned down the National Congress because they demanded too large a guarantee. I believe it is not necessary to go to such great expense, and think you can see to it that this is run upon a proper business basis and that we do not spend a large sum of money that will be much better spent along educational lines. I do not depreciate the usefulness of conventions, but many of them have become so expensive that they are not worth one-third of the money cities are asked to put up. I hope that any delegates who go to meet with the National Irrigation Congress will express themselves fully upon that question and see that when it comes to Canada it does not come as a white elephant, and is worth the money.

We had hoped to have had the Hon. Mr. Motherwell with us during this convention, but unfortunately he is unable to be present. However, we have Mr. Robert Needham, who is President of the Water Users' Association of Maple Creek, and we



Delegation from Cypress Hills Water Users' Association.



Delegates attending First Annual Meeting of the Cypress Hills Water Users' Association at Maple Creek.

will have a few words from him with relation to irrigation in the Province of Saskatchewan. I thank you for your attention, and I have pleasure in introducing Mr. Needham. (Applause.)

MR. NEEDHAM.—Mr. Chairman, ladies and gentlemen, I am certainly placed in rather an awkward position in being called upon without notice to speak to such a distinguished gathering as this. It is something I have never been in the habit of doing. However, I am pleased to be here to represent the Cypress Hills Water Users' Association, which was organized last winter, and we are certainly very thankful for the assistance which was given to us by the Western Canada Irrigation Association. Now, as to irrigation in Saskatchewan, there are a great many small schemes, but no large ones. They are all carried out by private individuals, some in a pretty crude manner and others in fair shape. Dry farming may be all right, but from the sample of alfalfa I see here on the platform—I don't know who has grown it, or whether it came from the United States, Alberta or from the rich soil of Saskatchewan—I am certain it was never grown under dry farming conditions. We have not accomplished very much yet, but I think as the scientific features of irrigation come to be more generally understood, we shall be able to get some good results in those portions of Saskatchewan where irrigation is necessary. (Applause.)

CHAIRMAN.—Two gentlemen, the Hon. Mr. Ross and the Hon. Price Ellison, were to have been here this morning, but unfortunately they have been prevented from reaching us. However, Mr. E. Foley-Bennett, Mayor of Penticton, is here with us this morning and we will be glad to have a few remarks from the gentleman from British Columbia.

MR. E. FOLEY-BENNETT.—Mr. President, ladies and gentlemen, I certainly feel very diffident in being asked to take this position this morning, that is to represent the men of agriculture in British Columbia. As a matter of fact, it is only a few minutes ago since Mr. Rankin informed me that I was to be called upon to address you. However, though it is your loss, I am sure I cannot but feel the honour conferred upon me. Mr. President, I wish to take this opportunity of expressing the delight that I experienced in entering this beautiful city of Lethbridge. This is my first journey east, and it has been a revelation to me to pass through this beautiful country and finally land here where is evidenced such a progressive and prosperous condition.

We have heard a good deal of Lethbridge, but I have never yet had the pleasure of seeing it, and I can assure you that when I return again to the Okanagan Valley I shall have many compliments to tell my people of this beautiful country.

In referring to the question of agriculture in British Columbia, I am very sorry indeed I am not really posted sufficiently to speak very intelligently on the greater portion of it. The question of agriculture in British Columbia is entirely different to this province. It is not a grain-growing country, as you know, though we do grow splendid crops of hay and vegetables, but we particularly devote our attention to horticulture, and probably as most of you know, the great Okanagan Valley is rapidly becoming the garden of the Dominion in the way of fruit growing. I might state that in the Okanagan Valley, from Vernon south, there is approximately \$30,000,000

invested in irrigation and the planting of orchards. It is particularly interesting to us to know how to take part or to do what we can in this great question of irrigation, and it is for that reason that some of us have travelled to this convention to obtain information as to the great benefits that accrue from irrigation.

Later on, it will be my privilege, Mr. President, to ask the delegates here to use their influence and their votes in obtaining the next convention for Penticton. I don't know that I can deal very fully with the question of agriculture. Had I known that I was to be called upon, I would probably have had some statement ready, but I again wish to express to you the pleasure I feel on being here and seeing around me such a spirit of progress and prosperity as is apparent in the city of Lethbridge and surrounding country. I thank you. (Applause.)

CHAIRMAN.—I have very much pleasure now in introducing to you Dr. J. G. Rutherford, Superintendent of Agriculture and Animal Industry, Canadian Pacific Railway.

Dr. J. G. RUTHERFORD.—Mr. President, ladies and gentlemen, this is an unexpected pleasure for me, and I presume, an equally unexpected trial for you. I have a paper to read later on during the convention but had no idea I was to be called upon this morning. I remember, when I was a small boy, there was a peculiar and very peripatetic individual who used to sweep our chimneys. He was known as Sweep Davy. He was quite a character, and in our house was a crooked chimney which was a nuisance because the jackdaws used to build nests in it. My father, who was like some of our friends, a minister, had the idea that he knew a good deal about almost everything and among other things about chimneys. (Laughter.) I remember one day he delivered a very long and very impressive address to this Sweep Davy on how chimneys should be swept, and Davy looked up with a twinkle in his eye, and he had a black suit and his brooms sticking up over his shoulder and carried his little bunch of spruce boughs in his right hand, and said, 'Mr. Rutherford, the next time ye have to make an address, I would advise you to speak about something ye ken aboot and not aboot chimneys.' (Laughter.) That made a very deep impression on my youthful mind, which was then in a far more plastic condition than now, and I have always since endeavoured to follow his advice, and when I undertook to speak about anything, to speak about something I kened aboot. I must say that I don't know very much about irrigation of this particular kind (laughter), but anything at all that is of interest or value in the cause of agriculture is of interest and value to me, and therefore I am here. I came to learn, not to teach, but at the same time a man must know, if he knows anything, that from the days of Noah till now, vast benefits have accrued to the human race from the use of water in moderate quantities and under proper control. We know from the most ancient days that irrigation of the land by artificial means has been practised with great advantage, and we also know that—although many of us, especially those of us who are younger, think that we know everything—we don't know nearly as much about the artificial use of water as did many of the ancient people. We find their old works all over the land. We find that in Asia, the old works still stand and many of them are still in use. Others have fallen into disuse. We find ancient methods of securing and using water have been abandoned, and we find the ancients knew a great deal more.

I speak with a certain amount of modesty, more or less becoming a man who knows so little about the subject under discussion, but I would say I was very much surprised to find among some of the older countries of Europe in which irrigation existed in very early days, but which during the Dark Ages fell into disuse, that for four or five hundred years in some of those countries irrigation has been practised and methods for the control and conservation of water studied to an extent of which I had no previous knowledge. I found in some of the old countries of Europe that men were studying these questions, sent by the governments of other countries perhaps even more modern. They have been studying the systems in vogue in these countries for years in order to learn what they could in regard to the use of water. Anyone familiar with our western rivers and their erratic behaviour knows that enormous quantities of valuable silt come down and are in many cases lost and wasted, and when one considers how much might be done by the adoption of proper methods for the conservation of much of that water that goes to waste, it seems to me that after all our great irrigation works here in Western Canada—of which we are so proud and which we are so prone to criticize—are capable of a vast amount of improvement.

Now, anything that makes for better farming pleases me. I, like your worthy president, am bitterly opposed to the extensive occupation of land which has been, and is now, and will continue to be, the curse of Western Canada as long as it exists. I believe in intensive cultivation. Whenever I see a man putting in wheat on stubble and scattering the seed on top of the ground, I say, 'Why are you doing that? We learned thirty years ago in Manitoba that we could not do that and call it farming. I call it gambling.'

He says, 'I had no time to plough.'

'Oh, yes you did.'

'No, no, I could not.'

'How much land did you have?'

'Well, I had to put in four hundred acres of crop.'

Now, there is the whole thing. Probably one hundred acres was all that man was in a position to properly handle. That is the trouble. The great bulk of our people are not farmers; they are gamblers—dead game sports. (Laughter.) They are risking their credit and comfort and the comfort of their wives and families on the principle of get rich quick—make a killing. That is all wrong. The only thing that will stay is intensive farming—scientific agriculture—and as irrigation undoubtedly helps that, it will always have my support. As you know, I am interested perhaps more in live stock. I have always been a strong advocate of mixed husbandry. We cannot keep on robbing the soil all the time and giving nothing in return, and the more you will get down to intensive cultivation the better for ourselves, the better for our country and the better for those who come after us. (Applause.)

CHAIRMAN.—I will now introduce Mr. William Young, of Victoria, B.C.

MR. WILLIAM YOUNG.—Mr. Chairman, ladies and gentlemen, I am very much in a similar position with the gentleman who preceded me, who came here, much like myself, to listen and learn. I regret that the Minister of Lands is not here, because I know he had been expecting to come. I have but recently come to British Columbia and have therefore not the knowledge that would permit me to speak authoritatively of all conditions there. However, I have this to say, that I recently made my first

acquaintance with the Western Canada Irrigation Association through some letters from your very efficient secretary. The statement was made that this gentleman here has some kind of a very excellent follow-up system and never lets a matter drop. In reply to these letters, the resolutions that were passed at the last session of this convention were all referred to, and in reply to one or two I sent along a copy of our Water Act and have not since heard from your secretary. I believe he is still studying it. In regard to the progress British Columbia has made in irrigation, those who are here from British Columbia are better qualified to speak on that, but I may say that last year, this year and the coming year will mark an historic period in the water legislation of our province. It was realized early last year that before we could properly and intelligently deal with the subject, some investigation must be made. This investigation was carried on by experts from across the line, and last session we were able to set rolling a system and an organization that will eventually round out and enable us to adjudicate and administer the Act in the interests of the province and the people. I may state in regard to the resolutions that were passed last year, that all of these were attended to with the exception of two. Those referred to the Irrigation Corporations Act and some investigation into the system of pumping with a view to doing something in the dry belt around Kamloops and that district. These are receiving attention now. While the Irrigation Corporations Act was prepared last session, unfortunately it did not go through, but we expect it to go through this year. We are now working to meet, as far as possible, all interests, with the point in view that the Act should be perfect as far as possible. In regard to the investigation of pumping, that will come on some time this fall, or perhaps during the winter. Regretting again that the Hon. Mr. Ross is not present to address you, I thank you for this privilege. (Applause.)

CHAIRMAN.—I will now call upon Professor R. H. Lyman, of the University of Utah. He is one of the visitors we are glad to welcome at the convention from across the line.

Professor R. H. LYMAN.—Mr. President, ladies and gentlemen, I can assure you that nobody could possibly be more surprised than I am at being called upon this platform at the beginning of your proceedings. I am as much surprised as I was yesterday. I have heard a great deal about Canada; of your beautiful fields, beautiful farms and extensive cultivated areas. My work has been largely in the State of Utah, and I have been engaged on one of the largest irrigation projects in the desert in the southern part of our own state. Yesterday and the day before, I rode through the deserts of Utah and some portions of Idaho and Montana and really, if the dreams of my infancy sometimes come true and in the great beyond I find a heaven as beautiful as I dreamed it would be in my boyhood days, I can hardly be more surprised than I was yesterday at the great expanse of beautiful fields and farms I noticed in this marvellous country of yours. (Applause.) I assure you, ladies and gentlemen, I am very glad to be here, and trust that together we shall have an excellent time in these few days.

CHAIRMAN.—I will now call upon the secretary to present his annual report to the convention.

SECRETARY'S REPORT.

Mr. NORMAN S. RANKIN, Permanent Secretary, then submitted his annual report, as follows:—

Mr. CHAIRMAN, LADIES AND GENTLEMEN.—Since our convention at Kelowna last August, many matters of interest to this association have come to pass, and while the report when printed will deal with them comprehensively, I do not propose to take up your time this morning by reading this report in full. I will therefore speak only of those subjects which I think are of the greatest importance, and of special interest to the convention.

If I were asked what particular good has been accomplished by this association during the past year, I should say:—

(1) Seventeen resolutions pertaining particularly to the irrigation and forestry interests of the country and the public in general, taken up and brought to an issue with the Dominion and Provincial Governments.

(2) Active part taken in the International Irrigation Congress in the United States at Salt Lake City, who have been invited to hold their next year's congress in the city of Calgary, with strong prospects of their acceptance.

(3) Attended (a delegation of ten) the International Dry-Farming Congress at Lethbridge.

(4) Assisted the irrigators of western Saskatchewan in forming a Water Users' Association, and induced them to send a delegation to this convention and appoint speakers.

(5) Interviewed and brought over to this convention from districts in which conditions are more or less analogous, to speak on subjects on which they are masters, prominent irrigationists from the States of Utah, Idaho, Oregon, Washington and California.

(6) Secured the co-operation of the Dominion Government's irrigation officers at Ottawa and Calgary, and tangible approval of the work being carried on from both Dominion and Provincial Governments, and the city of Lethbridge.

(7) Constitution revised, approved and issued.

(8) Spread considerable publicity regarding irrigation in western Canada in magazines and newspapers, of which a book of clippings is here open for inspection of delegates.

RESOLUTIONS.

As stated in summary, seventeen resolutions—fifteen passed by the association at the Kelowna Convention and the Business Meeting at Victoria in January have been followed through to successful action. In addition to these there were three or four resolutions of lesser importance, but as they required no follow-up action, I have not included them in the list. These resolutions in full will be found in the annual reports spread around the seats, but for the convenience of the meeting I will briefly enumerate them:—

Condolence with relatives in death of Vice-President R. H. Agur.

Re the formation of separate Provincial Associations.

Further legislation urged on British Columbia Government.

Dominion Government asked to amend Railway Belt Water Act.

Forms of agreement to be approved by Lieutenant Governor in Council.

Annual inspection of irrigation works by government.

Ditches to be kept free from noxious weeds.

Consideration of roads and tramways in subdividing land.

British Columbia Government urged to sink artesian wells for irrigation purposes.

Special business meeting British Columbia delegates, Victoria, in January.

Appointment of delegates to attend International Irrigation Congress, Salt Lake City.

Information to be sought regarding proper distribution of water.

Establishment of water districts.

Appointment of delegates to Dry-Farming Congress, Lethbridge.

Appointment of special British Columbia committee to approach government urging introduction of legislation to amend Water Act and permanent irrigation schemes.

Government requested to assist forestry officials in greater fire patrol watersheds.

Approval to International Irrigation Congress on account of internationalization of said congress.

All of these resolutions have been followed up, and those which have not met with the approval and action of the governments have brought expression from the governments and concrete reasons why they do not meet with their support. Separate files, dealing with each one of these resolutions, on which is all correspondence relative thereto, are at hand, and open to the inspection of all members of the convention.

The first point of interest, I think, was the National Irrigation Congress, held at Salt Lake City, September 30 to October 2, to which your committee of two, Dr. Dickson and your secretary went. This was an extremely interesting meeting, not only to our association but to Canada as well, for the congress after discussion extended the association to embrace the irrigation interests of the world and make it in name and in scope, international. Owing to our immediate vicinity, it is obvious that no country will benefit more by this move than Canada, and I am firmly convinced that your committee's attendance at both last year's and this year's Irrigation Congress has helped to bring about the present status of affairs. At the Chicago Congress in 1911, your president, the Honourable Mr. Ross, Mr. Fairfield and your secretary took part, while at the recent Salt Lake Congress in addition to the delegation above mentioned, Canada was represented by Superintendent of Irrigation, E. F. Drake, of Ottawa, Mr. W. H. Fairfield, and Mr. O. Kirkwold, Sales Manager of the Department of Natural Resources of the Canadian Pacific Railway, Calgary. At both of these conventions, Canada's delegates were honoured with seats on the platform and were heard from, just as any representative of Canada is heard from nowadays no matter where he may go or be. A full report of this convention was sent to your executive. Dr. Dickson, who attended as one of the representatives of this association, found upon arrival that credentials had been sent him from Ottawa with a request from the Minister of Agriculture that he also represent the government, and after discussing the matter with Mr. Fairfield, we decided that it would be proper and right for Dr. Dickson to accept. As Dr. Dickson has kindly sent me a copy of his report to the government, I have included extracts from it, rather than from my own report to your executive.

The following Canadian delegates were present: W. H. Fairfield, Lethbridge, Alta, and Dr. C. W. Dickson, Kelowna, B.C., representing the Dominion of Canada;

E. F. Drake, Ottawa, Ont., representing the Department of the Interior; Norman S. Rankin, Calgary, Alta., representing the Western Canada Irrigation Association, and O. Kirkwold, Calgary, Alta., representing the Department of Natural Resources, Canadian Pacific Railway.

The opening session of the congress was held in the forenoon of Monday, September 30, in the Mormon Tabernacle. Speeches of welcome were made by Richard W. Young, Chairman of the Executive Committee; George A. Snow, Chairman, Utah Board of Control; the Hon. Senator Newlands, President of the Congress; His Excellency Governor Wm. Spry, of Utah; His Honour Samuel C. Park, Mayor of Salt Lake City, and General Marshall, representing President Taft.

The famous 'Ode to Irrigation' and other music was rendered by the tabernacle choir of five hundred, orchestra and organ.

At the afternoon session, September 30, the report of the National Executive Committee was adopted. The most important feature of this report was that the scope of the congress should be 'International' instead of 'National.' Hereafter the title will be 'International Irrigation Congress.' Under this new arrangement, each of the provinces of Canada will be entitled to the same representation as the American States, viz.: Fifty delegates appointed by the chief executive; ten delegates from cities of 25,000, appointed by the mayor; five delegates from towns of less than 25,000 and over 1,000; five delegates from rural municipalities, boards of trade, commercial clubs, &c.

The principal address at this session was delivered by Reed Smoot, United States Senator for Utah, on 'Liberalizing of our Land Laws.'

I would like here to say that during his speech, Senator Smoot gave us a splendid opportunity for publicity regarding Canada. He said, 'Neither patriotism nor sentiment will prevent a man from going where he can better his condition,' and as he was referring to the immigration into Canada, it is obvious that he thought (as well as the farmers who emigrated did) that Canada was the place to better their condition. This item was telegraphed to our Calgary headquarters, where it was forwarded by wire to the principal news centres, Winnipeg and eastern Canada, Chicago and the States. Then the Californian delegate paid a glowing tribute to the law and order prevalent in Canada, saying that in Canada a man is considered honest until he is proved dishonest and then the law is so administered that full penalty is compelled.

To continue with Dr. Dickson's report, he says:—

Among other addresses at this session was an interesting one by Brigham H. Roberts on the early history and progress of irrigation in Utah.

The meetings of October 1 and 2 were largely taken up by the reading and discussion of papers dealing with various phases of irrigation problems.

On the afternoon of October 2, foreign representatives were invited to address the congress. Mr. W. H. Fairfield replied for the Dominion of Canada, and Mr. Norman S. Rankin for the Western Canada Irrigation Association. These gentlemen intimated that now the congress had been made 'International,' they hoped that the meeting might be held in Canada at no very distant date.

The final meeting held on the afternoon of October 3 was devoted to the consideration of the reports of the Committees on Resolutions and Organizations; selecting next place of meeting; election of officers, &c.

The report of the Resolutions Committee embodied some forty resolutions, which had been carefully considered in committee and were unanimously passed by the meeting. These resolutions covered a wide range of subjects dealing with irrigation, and will be brought before the United States Congress at its next session.

Phoenix, Arizona, was chosen as the next place of meeting, but as you will learn later, withdrew her invitation, and as no other offer was forthcoming there will be no congress of the International Congress this year. Following a lengthy address by a delegate from Idaho, inviting the congress to come to Boise in 1914, Dr. C. W. Dickson extended an invitation on behalf of western Canada for the same year.

Shortly after this the following telegram was received from Andrew Miller, Commissioner of the Calgary Industrial Bureau:—

‘Calgary Industrial Bureau through you desires to extend most cordial invitation to International Irrigation Congress to meet in Calgary in 1914. We also request delegation from congress to Lethbridge Dry-Farming Congress to visit Calgary and be our guests for a day. Kindly present invitation to convention.’

This telegram was transmitted to the Board of Governors, and while it was not in their power to fix the place of meeting for 1914, they expressed their appreciation of the invitation.

In his address to the congress, Mr. Rankin urged that official representatives be appointed to take part in 1913 convention of the Western Canada Irrigation Association to be held in Lethbridge, Alta. This was acted on, and we hope to have the satisfaction of having their official representatives with us to-day.

Arrangements were also made with a number of the prominent speakers at this congress to come to the Irrigation Convention at Lethbridge and deliver papers or addresses, and in this way the feeling of international co-operation in irrigation matters which has grown up in the course of the last few years is being extended.

There were in attendance at the Twentieth International Congress in the neighbourhood of 1,000 registered delegates, including five from Canada, and representatives of other governments as already stated.

Although there was some little feeling in the matter of making the congress international, the Canadian delegation was well received, and the sentiment of the majority was in favour of enlarging the scope of the congress, and working together with Canada to our mutual advantage.

We found that many of the problems which confront us in western Canada exist in the States as well, but often in a more aggravated form. We also found that they have to some extent at least, solved many of the questions that are before us at the present time, and that we can benefit very largely by their experience. The Government of British Columbia, realizing this fact, has called freely for advice from leading American irrigationists, and we trust that the same method will be extended, till our water laws and their administration are among the most perfect in existence.

While many interesting features of irrigation were touched upon, embracing all phases of the subject, it seemed to us that the dominant note sounded in many of the discussions, and in the papers read, was the importance of the problems confronting the actual water user. Such general questions as large engineering difficulties, &c., all seemed to be more or less subordinated to the questions that the settlers on the irrigated lands are struggling with. The feeling seemed to be that no matter whether

a water system was controlled by a company or the government, it was an absolute necessity that the rights of the individual be adequately protected, and that all water legislation should be framed with that end in view.

The question of pumping for irrigation received a good deal of attention, and is one on which the farmer should be given as much information as possible, especially in districts where the water supply is inadequate.

In the course of his address, Governor Spry, of Utah, strongly recommended the increase of the States bonded indebtedness where necessary to enlarge reclamation projects.

Governor Oddie, of Nevada, gave an outline of proposed new legislation in his State, providing for the formation of water users' corporations, and the terms under which the irrigation projects should be paid for, and old water rights adjusted.

DRY-FARMING CONGRESS, LETHBRIDGE, ALTA.

Probably one of the biggest events of the year that had to do with agriculture and one which attracted international attention was the Seventh International Dry-Farming Congress, which convened at Lethbridge in October, and was attended by 2,500 delegates.

Widely heralded, the congress brought out a large gathering of farmers and men interested in the cause of intensive agriculture.

Preliminary to the opening of the general congress, the agricultural exposition was thrown open to visiting delegates with an exhibition of soil products, grown under dry-farming conditions, that is, in a district where the average net precipitation is less than twenty inches. Here were upwards of 2,000 exhibits, ranging from a half peck of seed to everything grown on dry lands from many parts of the world. Seven foreign countries were represented, while fifteen States and four Canadian provinces had exhibits.

Western Canada demonstrated her agricultural supremacy at this exposition. The Canadian West made a clean sweep of the hard wheat, oats, barley and flax classes, both for the threshed grain and in the sheaf. But in addition, Alberta gained the signal honour of victory in a large majority of the classes for alfalfa, timothy and other fodders, while British Columbia fruit was awarded a large number of firsts. (Applause.)

Perhaps the feature which attracted the most intense interest was the wheat contest, wherein a prize of a huge steam tractor engine, valued at \$2,500, was offered for the best exhibit of one bushel of wheat grown under dry-farming conditions. This competition attracted an entry of more than 200 grain growers from all parts of Canada and the United States; even Jerusalem was represented as was also China. Farmers from the western provinces captured the sweepstakes open to the world for the best bushel of wheat, the best bushel of oats, the best peck of barley, the best peck of flax, the best sheaf of oats, the best sheaf of hard wheat, the best sheaf of western rye grass, the best sheaf of alfalfa, the best peck of potatoes and the best sheaf of timothy.

Mr. D. Graham, of Armstrong, B.C., won the prizes for the best peck of early potatoes and the best peck of late potatoes.

Mr. D. Matheson, of Armstrong, B.C., won first prize for Mann potatoes, for Alexander apples, for Winter Banana apples, Delicious apples and Northern Spy apples, while Messrs. D. Graham, of Armstrong, B.C., and J. D. Nicholson and J. Evans, of Salmon Arm, B.C., won other prizes. Out of 46 prize winners for wheat, barley and oats classes over 40 were Canadian farmers. In all, Canada carried off 242 out of 354 prizes and 12 out of 18 sweepstakes.

It is rather an interesting fact to note that Mr. Henry Holmes, Raymond, Alta., who won the sweepstakes prizes for the best bushel of wheat and the steam tractor engine, did so with the Marquis variety, some of his seed having been secured from Mr. Seager Wheeler himself, while Seager Wheeler, who won the \$1,000 gold prize at the New York Land Show last year for the best bushel of hard wheat, only came sixth. Mr. Holmes on being interviewed regarding his success, stated that his seed came from Magrath, Macleod, Winnipeg and Rosthern, that it was all sown in the same field and sown deeply. Being deeply sown was the reason it weathered the June drought. It weighed 65½ pounds to the bushel and yielded 31 bushels to the acre. Undoubtedly it is of interest to know that Mr. Holmes was assisted in his work by his son who is attending the Ontario Agricultural College.

F. W. Forster, of Pincher Creek, exhibited the heaviest bushel of Red Winter wheat which has ever been placed on exhibition, according to all available records. It weighed 68 pounds and was grown on the farm of P. C. Hanson, Pincher Creek.

Under the oat competition, seven of the prizes went to Saskatchewan, six to Alberta and one to Manitoba.

Our president, the Honourable Duncan Marshall, Minister of Agriculture for Alberta, accepted the exhibition on behalf of the congress, stating that in all his connection with agricultural matters he had seen nothing to surpass the splendid exhibits at the Dry-Farming Congress.

Alberta's Lieutenant Governor discussed the farming question, declaring his conviction that 100 acres well farmed brought superior results to 200 acres indifferently farmed.

The Honourable Martin Burrill, Dominion Minister of Agriculture, in an interesting speech called attention to the number of speakers in attendance, stating that there were more than 150 men ready to give information to farmers to improve their methods and yields.

A letter was read from Premier McBride, of British Columbia, expressing disappointment at not being able to attend, and wishing the congress success.

J. S. Dennis, 2nd Vice-President of this association, spoke of dry-farming from the railroad point of view, stating that as agriculture was the basis of the country's development, it was up to the corporations, governments and individuals to get behind it and push it along.

I might say much more about this great exhibition, gentlemen, but I believe I have touched on the main points, and if there are any questions which any of you desire to be informed about and will come to me at the close of this session, I will endeavour to answer your questions. I have a complete list of the prize winners in readiness.

SASKATCHEWAN IRRIGATORS FORM WATER USERS' ASSOCIATION.

An event of extreme interest in western Canada agriculture occurred at Maple Creek, Sask., on January 27, when seventy-five farmers from various parts of southwestern Saskatchewan and southeastern Alberta met and formed the Cypress Hills Water Users' Association. This association will work in conjunction with the Dominion Government Irrigation Department officials in framing rules, &c., for the use of water in irrigation in the district affected.

We were asked to come to this meeting and assist in the formation of the Water Users' Association, and as I was leaving to attend the New York Land and Irrigation Exposition, it was arranged that Executive W. J. Elliott and Delegate Robert S. Stockton should represent us, and in company with Mr. Burley, of the Government Irrigation office, they went down. Professor Elliott, in addressing the meeting, emphasized the advantages to be gained by a district in the formation of a water users' association, pointing out how the organization at the present time would eliminate difficulties that may arise later when the full amount of water will be called for in the Cypress Hills district for the irrigation of land that will in all probability be cultivated.

He also pointed out the advantage of their association being affiliated with the Western Canada Irrigation Association, directing their attention to the fact that matters that are, more or less, local, but which are backed up by as strong an association as the Western Canada Irrigation Association, often receive better attention at the hands of legislators, &c., than if an individual or a small association attempts to deal with them single handed.

Mr. Stockton then followed with a practical address on the difficulties of the irrigator, and a discussion of a district in Colorado that was very similar to the Cypress Hills proposition. There was a great deal of interest, and many questions were asked of Mr. Stockton.

Mr. Burley followed with an address, and Professor Elliott was again called upon to give an address, this time on the growing of alfalfa. This brought out active discussion.

Generally speaking, even the citizens of the Canadian West are prone to look upon Saskatchewan as a province where farmers put in huge areas of grain and leave the rest to Providence; it is doubtful if ten per cent of the residents of the province itself know that irrigation is practised to any extent in Saskatchewan. However, the Maple Creek district has the oldest operating irrigation project in western Canada; in 1896 a farmer installed and placed in operation a system near Maple Creek. This system is still in operation. Two small projects were constructed near Calgary prior to the date mentioned but neither are now in operation.

Southwestern Saskatchewan now has 275 private irrigation projects, most of them of a rather small calibre, putting water on approximately 70,000 acres. All of these are situated on the watersheds of the Cypress Hills and are of a nature unique in western Canada; in fact there are few districts on the continent where the same system is used. The Cypress Hills may be taken as the centre of a district, 60 miles wide north and south and 90 miles long, in which, at most seasons of the year, there is but scanty rainfall. For years this district was given over to the stockmen, and the idea was held that here the producer of range cattle would always be supreme;

the rainfall is not sufficient to produce abundant crops and there are no large streams for irrigation purposes.

However, there is a network of creeks traversing the district, most of them practically dry during the greater part of the summer. But in the spring when the snow is melting and during the heavy spring rains, these streams have a flood period of from five to thirty days when they run bank-full. During this limited period, some of them, at other times dry beds, run over 2,000 cubic feet per second. Some years ago a few stockmen conceived the idea of storing this flood water in reservoirs, and turning it on to their grazing land when needed during the dry months. They secured water rights from the Dominion Government, and put in dams diverting the water into reservoirs formed by building embankments across coulees or other depressions; from these they ran ditches to various parts of their holdings, and found that the moisture thus provided made possible the production of luxuriant crops of wild grass. So successful were their efforts that others turned their attention to irrigation, and now the Dominion Irrigation Department is taking a great interest in the work. A great many of those who first installed systems have gone further than the mere irrigation of tracts of wild grass; they are raising bumper crops of grain and alfalfa, timothy and other fodder, and the outcome bids fair to be the transforming of a district once a mediocre range to one producing large returns from every branch of diversified agriculture. The winters are mild enough, so that stock may be fattened outside and the soil when supplied with sufficient moisture during the growing season is capable of producing the largest volume of feed of all kinds.

There is no system of irrigation out of which more interesting and sometimes unpleasant situations may develop than in this one in vogue in the Cypress district. In certain districts of Colorado some years ago the operations of similar projects resulted in scores of legal actions and frequently in bloodshed. In Canada, excepting British Columbia, the Dominion Government controls the use of water for irrigation, and every company and individual, whether the proposed system be large or small, must take out a permit for the use of water. The volume allotted is according to the supply, the number of would-be users from the supply, and the acreage of irrigable land owned by the applicant. Priority in application rules; that is, the first to make application has first right to the supply of water, the second has second right, and so on until the available supply is exhausted.

Now it often happens that the farmer farthest down the creek has the prior right; that is, he made the first application for the use of water. Nevertheless, the man farther up the stream, when no supervision is supplied, may place a dam, divert the water and leave the man farther down with an empty reservoir. That was the situation that developed in Colorado before the government took a hand. Up to the present there has been no such danger in Saskatchewan as the flood supply is sufficient to take care of all demands. With the multiplication of the projects, however, there is always the danger of disagreeable complications. It is to forestall such a situation that the government is taking an interest in the Cypress Hills projects and that the water users themselves have formed their association.

The Irrigation Department has a force in the district, taking stream measurements, observing the flow of water at all seasons and determining the total volume of water available.

As the demand for this water nears the limit of the supply, it will have to be apportioned, and water-masters appointed by the department will, by gauging, see that each man gets his rightful portion. The water users themselves have seen that their operations cannot be wholly successful unless thoroughly supervised. At their Maple Creek meeting they adopted rules for the use of water and elected officers. They divided the district into ten subdistricts and chose an executive committee of ten, one from each district. Disputes that involve but one subdistrict will be settled therein, but those of larger significance will have the action of the whole body.

The officers elected were: Hon. President, D. J. Wylie, M.P.P, Maple Creek; President, Robert Needham, Piapot; 1st Vice-President, A. G. Williamson, Maple Creek; 2nd Vice-President, W. X. Wright, Battle Creek; Secretary-treasurer, G. S. Herringer, Maple Creek. The following form the executive: I. H. Williams, Maple Creek; George Thompson, Gull Lake; Allison Smith, Medicine Hat; Francis Wright, Coleridge; Thos. Hargrave, Medicine Hat; John Stewart, Maple Creek; Ernest Dimmock, Skull Creek; Dan Morrison, East End; Jacob Armstrong, Maple Creek; David Wood, Coulee.

On May 24, Messrs. W. H. Fairfield, W. H. Pawson of Coaldale, and your secretary, attended their First Annual Convention, addressed the delegates and invited them to send a delegation to this convention, and as a result we have with us to-day a delegation of twelve members, while Mr. Walter Huckvale will later address us on 'The Irrigation Farmer,' and Dr. Allison Smith on 'The Advantages of Irrigation.'

GOVERNMENT GRANTS.

I visited Ottawa in November in connection with the renewal of the Dominion grant. You may remember that last year, in addition to publishing our report, the government added a small grant of \$500 at our request, and I was anxious to have this made permanent. This, I believe, has now been done.

The British Columbia Government have shown their appreciation of our efforts and complied with our resolution passed at the Victoria Business meeting last January by making a grant of \$1,000 and have expressed their intention of making this an annual one in place of a biennial one of \$2,000.

Alberta, through our president, the Honourable Duncan Marshall, Minister of Agriculture, granted \$1,000, and I am in the hope that they will also make this grant a permanent one, although no expression has come from them yet to this effect. With these sums in hand now I feel that we can bring to our annual convention men of worth and ability, meet our current expenses during the year, and promote the general welfare and interest of the irrigators in the three western provinces.

In the list of grants, Lethbridge's generosity to this association has forever won for her the sympathy and appreciation of our members. Without any financial request from your secretary, whose only reference to the matter was the extension to the City Council and Board of Trade of the appreciation of the executive for any entertainment that might be provided, \$1,000 was voted to cover entertainment and reception. You will yourselves, before leaving, see what splendid hosts the people of Lethbridge are when they set their hands to it.

NEW YORK LAND SHOW.

I had the good fortune to attend the New York Land and Irrigation Exposition, and returned home via Chicago, making a brief visit to the Chicago Land Show. I would like to say regarding the Chicago Land Show that the British Columbia Government had a very attractive display of fruit and resources, and think that their booth was one of the best, if not the best at the exposition.

One matter of interest at the New York Land Show, and about which I wrote to the executive, was a working model of the Overhead Electrified Irrigation Company. This is a process whereby electrified water is sprinkled on the land in the form of rain by means of overhead piping and windmill or other power. It is claimed by the inventors that just as electricity will invigorate the human body, so will it invigorate and promote plant growth, and though I have no proof that the process has proven a success, their claim most certainly sounds reasonable. There are some seven or eight truck farms on Long Island already installed with this system, the cost per acre being \$150 with a very small daily operation cost.

SPECIAL BUSINESS MEETING OF BRITISH COLUMBIA DELEGATES.

In accordance with a resolution passed at the Kelowna Convention, the British Columbia delegates to the number of about forty met for a business meeting in the Empress Hotel, Victoria, on the morning of January 9. President, the Hon. Duncan Marshall, Vice-President W. C. Ricardo, and five members of the executive were present. The British Columbia Government was represented by the Hon. Price Ellison, who welcomed the delegates to Victoria, and assured them of the sympathy and hearty support of the government. The status of the various resolutions passed by the association at the Kelowna Convention was reported by the secretary, who also outlined briefly the past five months' work. Of the fifteen resolutions, six then remained unsettled in the hands of the government, but as a result of the meeting were disposed of.

In respect to the important resolution requesting the government to make an annual inspection of all irrigation works, Mr. Armstrong replied on behalf of the government, 'that engineers would be appointed to supervise the works of irrigation companies, and would have full authority to inspect any work considered dangerous and have immediate charge of the distribution of water. Being resident engineers they would be ready to inspect works at any moment.' This information was received with applause.

Resolutions regarding, (a) further legislation urged on British Columbia Government, and (b) the control of water records, irrigation companies, &c., which were outstanding, were fused, and a committee of five, composed of Messrs. Thos. Bulman, J. A. MacKelvie, H. W. E. Canavan, C. E. Thrupp and M. Herron, was appointed to interview the government regarding them. These gentlemen immediately approached the Premier, with the result that legislation was introduced this spring to this effect. It was moved by N. S. Rankin, seconded by Dr. Dickson,—

'That the British Columbia members of the Western Canada Irrigation Association in session here to-day, forward to the Oregon Irrigation Congress, also in session to-day, a telegram of felicitation and good fellowship, and hope that they will before adjourning appoint a delegation to attend the Seventh Annual Convention of the Western Canada Irrigation Association, to be held next summer in Lethbridge.'—Carried.

This brought a prompt telegram of thanks from the Oregon Irrigation Congress, with advice of the appointment of their president and secretary as a delegation to this congress, and I am happy to say as a result these gentlemen are with us to-day.

Moved by Dr. Dickson, seconded by Mr. Rankin:

‘That the British Columbia section of the Western Canada Irrigation Association in special convention assembled, desire to express their appreciation of the action taken by the British Columbia Fruit Growers’ Association in holding their annual meeting just prior to the meeting of this association, which enabled a large number of British Columbia fruit growers interested in irrigation to attend our session.’—Carried.

It was moved and carried that:

‘We the members of the Western Canada Irrigation Association, in special session assembled, wish to express our appreciation of the action taken by the 20th National Irrigation Congress, held in Salt Lake City, Utah, in making the scope of the congress international, and for the many courtesies extended to the delegates of the Western Canada Irrigation Association who attended the Salt Lake City congress.

‘We also wish to express our approval of the action of our delegates, the Calgary Industrial Bureau, and the city of Calgary, in extending an invitation to the International Irrigation Congress to hold its 1914 session in Calgary, Alberta.

‘We consider that the best way to increase the efficiency of the International Irrigation Congress and to develop the international character of the organization would be to hold the congress in Canada in 1914.

‘We would, therefore, ask the Board of Governors and Executive Committee of the International Irrigation Congress to use their influence in this regard, and to help to make the congress international in fact as well as in name.’

This resolution brought earlier action than was expected. Upon some misunderstanding with Phoenix regarding this year’s congress, the president wired offering to bring it to Calgary this summer. Calgary Industrial Bureau replied, however, reiterating their invitation to the congress in 1914, advising that they were not this summer prepared to entertain the meeting owing to many previous conventions, and lack of sufficiently large assembly hall which would be erected in readiness for the congress in 1914.

It was moved and seconded, that:

‘Whereas the protection of the watershed is essential to the existence of irrigation.

‘Be it resolved that this convention press upon the government the importance of the subject and give special support to the Forestry Department in having our watersheds patrolled in the Dry Belt of British Columbia.’

Mr. Ricardo presented Hon. Duncan Marshall, President of the Western Canada Irrigation Association for 1913.

Mr. RICARDO.—Mr. Marshall is Minister of Agriculture for the large Province of Alberta, which we are enormously interested in, as it takes our timber, our fish and our fruit, they in their turn shipping their grain to us. They have some of the largest, if not the largest, irrigation works on the American continent, so we are doubly interested in them, as we have irrigation works of our own.

Hon. Mr. Marshall was then called on to take the chair, which he accordingly did.

CHAIRMAN.—Gentlemen, I suppose the first thing I should do is to thank the people who are here this afternoon who were delegates at the last association convention for electing me president of this association this year, and I assure you that if there is any thanks in the business, it is due from me to you and not from you to me, because this is a year in which I am going to learn something from this irrigation association, and I am absolutely sure it is not going to learn anything from me, for I know, I may say, practically nothing about irrigation or its working.

As you are aware, the irrigation laws of Alberta are administered by the Dominion Government, consequently our government does not come into direct contact with these laws, and our Department of Agriculture up to the present time has not done anything along irrigation lines. Anything along the lines of educating people in this has been undertaken by the Dominion Government or irrigation companies in the province, therefore I appreciate very much my election to this position, which I regard as due to the fact that I occupy the position in my province that I do, and that it is a compliment to the Province of Alberta and its agricultural interests.

I thank you also because it brings me into direct contact with this association and its work, and I hope to learn something of the work this year, not only in my own province but in British Columbia as well.

I am very glad to attend this meeting to-day, if it were for nothing but getting better acquainted with some of the farmers of the Province of British Columbia. The Rocky mountains seem to make a more or less impassable barrier between the two provinces, and I do not believe we have had intercourse enough along agricultural lines. You produce many things, such as fruit, in this province, that we cannot grow in our Province of Alberta, and we naturally look to you to supply us with many of the things we cannot produce. We think that in our province we can produce some agricultural commodities better and in more abundance than you can, and we hope to open up a greater trade between these two provinces.

I may say, gentlemen, that so far as irrigation in our own country is concerned, it has been carried on largely by the companies or corporations that have irrigation lands at their disposal, but I may say that during the last year some of the irrigation companies, and especially the Canadian Pacific Railway, have done a great deal of useful work for the development of agriculture. The work done by the Natural Resources Department of the Canadian Pacific Railway in the bringing in of live stock and its disposal to men in the southern parts of Alberta, has done a great deal to stimulate the live stock industry in Alberta, and as conditions exist to-day in our province, the salvation of the farmer seems to lie in the development of the live stock and dairying industries. While the southern part of our province especially is as good for the production of wheat as any country in the world, the present prevailing grain prices are so exceedingly low that a man cannot dispose of it at a profit unless he has stock to feed it to, and so we to-day regard the live stock industry as the most important branch of farming in Alberta.

I have no doubt, though my knowledge of British Columbia is not so great as it should be, from what I do know, that while you are a fruit-producing province, you have very many splendid stretches of agricultural land that for dairying and stock raising cannot be excelled.

I understand that the delegates to-day, with the exception of a few of the executive, are British Columbia men, and the problems you wish to discuss are British Columbia problems, and I did not come here this afternoon to tell you how much better Alberta is than British Columbia. I came rather, just for the purpose of presiding over this meeting, becoming better acquainted with the irrigation farmers of British Columbia, and learning something of the problems you have to solve in connection with irrigation, and consequently fitting myself, in some small measure, for the position that the delegates at the last meeting so kindly honoured me with.

Thanking you for your patient and indulgent hearing, I will ask you to proceed with the business of this afternoon's meeting.

The Hon. Price Ellison, Minister of Agriculture for British Columbia, was then called upon to make a few remarks.

MR. ELLISON.—Mr. Chairman and gentlemen, I wish to welcome the Minister of Agriculture of Alberta to Victoria, and to apologize for the weather.

With reference to irrigation, my colleague, Mr. Ross, ex-president of this association, was called away very suddenly, and I will ask the secretary to read a letter that will explain why he is not with you to-day.

The secretary read the following letter from Hon. Mr. Ross:—

LANDS DEPARTMENT,
VICTORIA, January 8, 1913.

HON. PRICE ELLISON,
Minister of Finance and Agriculture,
Victoria, B.C.

MY DEAR MR. ELLISON.—I regret very much that because of the receipt of an urgent telegram from Fernie this morning, I shall be obliged to leave the city at once, and thus absent myself from the special sittings of the Irrigation Convention which assembles here to-morrow.

As an ex-president of this useful organization, I am anxious that you should explain, as soon as the opportunity offers, the reasons why I am unable to attend and take part in the discussions that will take place.

Because of the very keen interest that you personally have taken in irrigation matters, I shall ask you to be good enough to represent me during the various meetings that may be called.

Kindly give my best wishes to all present.

Yours very truly,
(Sgd.) WM. R. ROSS.

MR. ELLISON.—Mr. Chairman, I quite understand that there are some matters which have been pending between my colleague and the secretary with reference to resolutions passed at your last annual meeting in Kelowna, and while he has not been able to deal with them, as he would have liked to, and there are still some matters that have not received his attention on account of his not being able to decide personally, because, you will understand, it deals with the policy of the government. But you may depend that Mr. Ross' sympathy is with this association, and I was more than delighted at Kelowna to find that he did co-operate and come nearer to committing himself to what we have all been trying for and advocating for years—government assistance to irrigation generally. You all noticed that he was very favourably impressed, and I was delighted.

Now, it goes without saying that all you people are deeply interested in irrigation, as in dry-farming, but perhaps this is a greater problem, and especially in British Columbia, where we run up against the mountains in every direction. You can scarcely go in any direction without coming to a mountain or a stream, and it is a very difficult matter to settle. The policy of the government is not decided, but a great deal will depend, in my opinion, on how strong you make your case. You know the government realizes what it means to have the land that is now lying idle made profitable and brought under cultivation. There is no difference, Mr. Chairman, in whether you take the water off the land or put in on the land, you do it for the one purpose—to make it productive, and that also applies to clearing the land. When you think of one you think of the other.

I say the time has come for the government to take over this question, and it should be done at once without any further preliminaries. I have been thoroughly convinced for years that it is the proper thing to do, as the scheme is so large that private capital cannot take care of it, and the private capital invested in irrigation to-day in this province is only covering land that they are interested in themselves, or on which they have been paid by a bonus to put water. These companies have found it a greater undertaking than they thought, and they quite realize that the country is not being served by the systems they have installed in the different parts of the province. Now the government is thinking seriously of what is best to be done, and what could be done to assist agriculture in every way possible. The government has appointed a commission to inquire into matters pertaining to agriculture in all its branches, and it will be the privilege of the committee of this association to lay its views before the Agricultural Commission, and I have no doubt that it will depend very largely upon the recommendation of that committee what policy the government will adopt. I am not speaking for the government, gentlemen, but this is how I feel myself, and the object of the government in appointing this commission is to be advised on matters pertaining to agriculture.

We hope that the benefits of your meeting here to-day will go a long way towards solving the problems now before us. British Columbia, and Alberta also, will be greatly benefited by systems of irrigation, and we only hope that by the time the annual meeting comes around again there will be something definite along the lines of the resolutions you passed at Kelowna. I know that my colleague is very much interested, and you may depend that he will do his utmost to further your wishes in every possible way.

Vice-President Ricardo moved a vote of thanks to Hon. Duncan Marshall on the occasion of his first visit to Victoria to the Western Canada Irrigation Association.

This was seconded by Mr. R. M. Palmer, and carried unanimously.

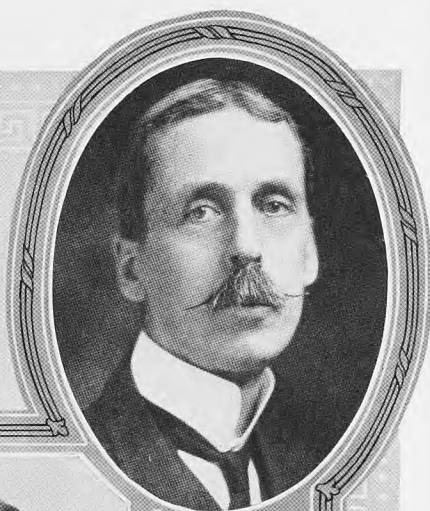
CHAIRMAN.—Mr. Vice-President and gentlemen, I will just thank you for thanking me, and I am very pleased to have had this excuse for coming to your capital city and meeting you, and hope to welcome you all and many more of you in the city of Lethbridge next summer.

Three hundred copies of the new report were received from the government at Ottawa in time for distribution at this meeting.

In conclusion, I wish to refer to the excellent work done by the local board and secretary, who are largely responsible for the splendid entertainment provided and



*J. Hinkle,
Secretary,
Oregon Irrigation Congress*



*James White,
Asst. to Chairman,
Commission of Conservation*



*J. H. Lewis,
State Engineer,
Oregon.*



*R. H. Lyman, Prof. of Engineering,
University of Utah,*



*Dr. J. G. Rutherford, Superintendent
Animal Husbandry, Agricultural Branch, C.P.R.*

gathering here to-day. I also rejoice to see for the first time representatives from the Oregon Irrigation Congress and the Cypress Hills Water Users' Association, and express the hope that they will again be with us next year at our convention in British Columbia. (Applause.)

CHAIRMAN.—I am now going to call upon Mr. J. T. Hinkle, Secretary of the Oregon Irrigation Congress, to address us for a few minutes.

MR. J. T. HINKLE.—Mr. Chairman, ladies and gentlemen, This is not my time to speak; I note that from the programme; but this will perhaps afford an opportunity for me to say a few words of compliment to your delegation in attendance at the National Irrigation Congress last year—now the International Irrigation Congress. I had the pleasure and good fortune to travel with your secretary, Mr. Rankin, and with Dr. Dickson, over the Oregon Short Line System to Salt Lake City last September, and I was especially interested in watching these two gentlemen as well as other Canadian friends in attendance, particularly Dr. Dickson and two other gentlemen whose names I do not recall. I had my eye on these gentlemen all the time. I don't know why. I think perhaps I wanted to see what kind of people the provinces of western Canada would send down to an irrigation congress, and what kind of a showing they would make. I recall one incident that may be of interest to you. I was sitting on the platform by the side of Secretary Rankin and Dr. Dickson and other foreign representatives, so called, to the Irrigation Congress, and some gentleman made a speech in which he called attention to the reasons why so many of the people of the States were seeking investments and homes in western Canada, and he spoke particularly of the greater liberality of the public land laws. Mr. Rankin, who was sitting at my side, said he would have to be excused for a moment. He went out and after he returned, I heard him whisper to Dr. Dickson that that little statement had hit the wires and would be in the hands of every newspaper in the provinces of Canada before night. That is what I call a 'live wire.' (Applause.) That little item reached the Canadian press before it reached the press of Salt Lake City. These men were wide awake all the time. I don't suppose I should have been here—I have no particular interest in this country—but I am here in response to a kind invitation.

He said, 'Hinkle, will you come up to our meeting at Lethbridge?'

I said, 'Yes, I will come,' and so I came, and a thought occurred to me that we often make a great mistake in not pressing our invitations upon people. People do not come usually without invitations, and so many of our people that would be glad to meet you and listen to your discussions, and would be glad to give you their experiences as practical farmers and irrigators, would come here if they simply had the invitation to do so.

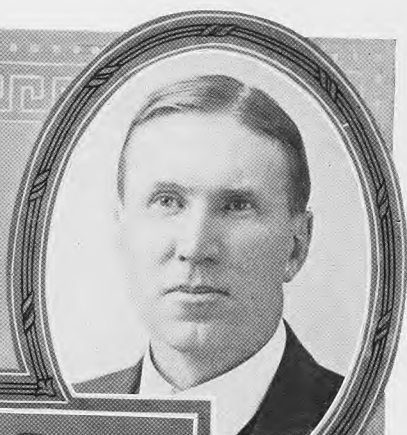
Now, I want to say a word about the National Irrigation Congress. Your president has spoken of the burden of entertaining that congress. I was with the representative from Phoenix, Arizona, who extended an invitation to the congress to meet there this year. He was given to understand that the guarantee by the city of Phoenix would be \$7,000. After the meeting of the Executive Board, the Board of Governors informed the gentleman that his city would have to deposit \$12,500. That placed him in a very embarrassing position, and he said, 'Gentlemen, how can you expect me to wire back to my people and say, after telling them that the cost would be \$7,000, now,

after it has been voted to go to Phoenix, the cost is \$12,500?' You can hardly appreciate the embarrassing position that man was placed in. Now, you are making arrangements for the entertainment of that congress next year, and it is a great congress, but what you might pay for it is not the question; the question is that it ought to be self-supporting. I have the honour to be permanent secretary of the Oregon Irrigation Congress. This organization grew out of necessity, or a difference which naturally arose between the officials of the United States Reclamation Service in that country and the water users of Oregon, the irrigators upon the land. So we called the congress. The press could not understand the situation. The great papers of the city of Portland could not understand why the work of the national government was retarded in the great state of Oregon. This congress was called together. We came to a complete and perfect understanding. Men got up and aired their grievances. They told what was the matter on the land, and the result was they came to a better understanding with the representatives of our Reclamation Service and with the representatives of our agricultural experimental farms working throughout the state.

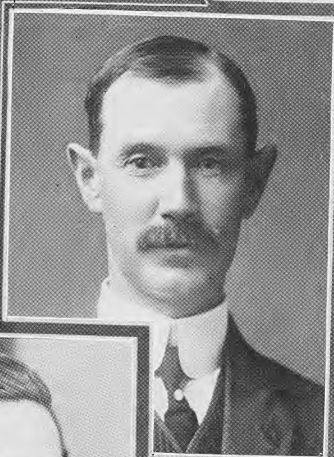
These conventions are an absolute necessity in order to arrive at a proper understanding of conditions that confront us, and to reach the solution. That Irrigation Congress, at the last meeting, had certain measures of legislation that they wanted put through. They passed resolutions to that effect. Our legislature met. We had our representative there and every single resolution there, from top to bottom, was enacted into the law of our state—a most favourable showing for any organized body—and we are now complimented by the authorities of all the states of the Union. So you must have these things and you must get the farmers, the men who are dealing with agricultural problems upon the land. You must hear their views; you must know what they think and say in order to arrive at a proper understanding of what ought to be done under any given set of circumstances. One illustration: the State of Oregon had been fooling along with an irrigation project for ten years under the so-called Carey Act. It was an absolute failure and disgrace to the state. Settlers went there in the belief that great things were being done under the seal and authority of the state and came to find, after they had made a few payments, they had no water; that simply a ditch had been built that would not hold water, and the settlers went away after having lost their time and their money. The Oregon Irrigation Congress passed resolutions demanding that the State of Oregon, regardless of constitutional limits, pass an Act and make the work good, and a Bill was introduced asking for \$450,000 to complete the work. It was a radical measure, and the men who introduced it said if they could get a minority report, that would be reasonably satisfactory, but some looked at it differently. We had men there from every irrigation district in Oregon. We went before the Ways and Means Committee and demanded a unanimous report upon that deal and we received it. After that, we went upon the floor of the House, showing reasons why this should be done, and carried the measure almost unanimously. Out of ninety voters, only three or four dissented. Then it was said that the Bill would be killed in the Senate, but when it got there we had forty delegates, and when the farmers walked in on that committee and coolly informed them that if the Bill was not passed they would never be returned again in those districts, they concluded to endorse it; so the Bill passed the Senate. The secretary



*Dr. Allison Smith, Representative of the
Cypress Hills Water Users' Association, Maple
Creek, Sask.*



*R.H. Campbell,
Director of Forestry,
Ottawa.*



*E.F. Drake,
Superintendent of Irrigation,
Ottawa.*



*W.N. Millar,
District Inspector of Forest
Reserves, Calgary.*



*Walter Huchvale, Medicine Hat,
Representative of the Cypress Hills Water
Users' Association, Maple Creek, Sask.*



*F.H. Peters, Commissioner
of Irrigation, Calgary.*

of the Oregon Development League had a gold pen in his pocket—a brand new one. Everybody said Governor West would veto the Bill. The secretary took his gold pen and walked into the Governor's office and said, 'Governor, I am secretary of the Oregon Development League. Here is House Bill 73. Here is a gold pen presented to me by the Oregon Irrigation Congress. I want you to sign that Bill.' And the Governor, with his kindly smile, wasted no time whatever and sat down and wrote his splendid signature across the face of that Bill. And I want to say to you people of western Canada that your government officials are looking for the things you have to say. If any of them are here to-day, they are not here for the purpose of hearing me speak; they are here for the purpose of hearing some of the actual men upon the land get up and say something in order to ascertain what he wants, and in order to get what you want all you need is to maintain a good organization and go where the people are. Know what you want; go and demand it, and you are sure to receive it. (Applause.)

Now, ladies and gentlemen, I will have something more to say later on, and I am very much in hopes that the president of the Oregon Irrigation Congress will be here to-night. I believe he will be, and if so, I can promise you a splendid address from him. I thank you, and later on I will endeavour to give you my ideas along the line of the subject named for me on the programme. (Applause.)

CHAIRMAN.—It is now the duty of the chairman to name the Committees on Credentials and Resolutions. The first-named in each case will act as chairman of the committee.

As a Committee on Credentials, I will name Messrs. W. H. Fairfield, E. Foley-Bennett and Robert Needham.

As a Committee on Resolutions, I will appoint Messrs. William Pearce, E. F. Drake, W. J. Elliott, C. W. Dickson and Walter Huckvale.

The next item on the programme is a photograph to be taken of all those in attendance at this meeting, including the ladies, at the front of this building, immediately after the adjournment; after which the members of the Fire Department of the city of Lethbridge will give a demonstration for the entertainment of the visitors.

I would ask the members of the Committee on Resolutions to meet immediately after the photograph has been taken.

I will now declare this session adjourned, to meet this afternoon at 2.30.

The delegates adjourned accordingly, and the exhibition given by the Fire Department was much appreciated.

TUESDAY AFTERNOON SESSION.

CHAIRMAN.—The convention will come to order. I might say that the Committee on Resolutions will meet at the close of this meeting, in this room, and all parties with resolutions to submit will kindly hand them to Mr. Pearce, chairman of the committee.

There are some copies of a report on Stream Measurements issued by the Irrigation Branch of the Department of the Interior, for distribution at the door, and if the supply runs out, you can get more by leaving your names and addresses with the secretary.

The first speaker this afternoon is Mr. E. F. Drake, Dominion Superintendent of Irrigation, Ottawa, who is to speak to us on the progress of irrigation.

THE PROGRESS OF IRRIGATION.

BY E. F. DRAKE.

MR. PRESIDENT, LADIES AND GENTLEMEN.—The officers of this association are to be congratulated upon the large attendance at this convention. The Sixth Convention, which was held last summer at Kelowna, was, I believe, the best attended of any up to that time, and now probably a new record has been established.

We who are not directly responsible for the success of these conventions sometimes assume that success can be assured merely by fixing a date, announcing a programme, and sending out a general invitation to those who should be interested in the subject. It doesn't work out so in practice. Even the fixing of a date is far from easy. Care must be taken not to conflict with other gatherings or with the engagements of those who are to take part in the proceedings, and it is an exceedingly difficult thing to arrange a date which will suit all. Then there is the difficulty of securing the right kind of speakers—recognized authorities in their several lines of work—and the even greater difficulty of securing a reasonably large attendance.

The fact that all of these have been successfully arranged is the best possible proof that this association has been well served by its present officers. A very large part of the credit is, I am sure, due to the efforts of your energetic secretary, Mr. Rankin.

The Western Canada Irrigation Association is now entering upon the seventh year of its existence, having been founded in 1907. The first convention was held in the city of Calgary in the summer of 1907, and the next at Vernon, B.C., in the following year. Subsequent meetings have been held at Calgary in 1909, Kamloops in 1910, Lethbridge in 1911 and Kelowna in 1912.

The promoters, if one may apply that term, were public-spirited men who believed that such an association should serve a useful purpose in collecting and disseminating information respecting irrigation and in providing a common meeting place where those interested in the subject could get together for the discussion of the many problems that were certain to develop as irrigation came into more general use. No attempt has been made to 'boom' irrigation, and the results so far achieved have not been spectacular—there has, however, been steady progress, and now the results anticipated by the founders are being realized in some degree.

Evidence of the greater interest which is now taken in the subject of irrigation may be found in the formation last year of the Cypress Hills Water Users' Association. This association comprises a considerable number of men in the Maple Creek-Medicine Hat districts, who purpose meeting from time to time for the discussion of questions of special interest in their own neighbourhood. They purpose affiliating

with this association and have several representatives present at this convention. This is one of the direct results of the older association, and seems to be a direct outgrowth from it.

The association has never been plentifully supplied with funds and has, in fact, never had at its disposal enough money to permit of carrying on a very extensive campaign for the encouragement of irrigation farming. Small grants of money have, from time to time, been made by the provinces in which the conventions have been held and the Dominion Government has also made a small grant. The reports of the proceedings of these conventions have been published, and partly distributed, by the Dominion Government free of cost to the association. In this way the association has managed to avoid financial disaster and has been enabled to do some really useful work in a modest way.

Unfortunately, the Minister of the Interior has found it impossible to be present at this convention. While I cannot claim to represent the Hon. Dr. Roche in any official capacity, he has very kindly authorized me to say to you, Mr. President, that he will be glad to publish the report of these proceedings without cost to the association, as has been done in the past, and he is also willing to renew for next year the grant which you have received for the present year, if the association continues its good work and requires such assistance. I assume that there is no doubt as to either of these conditions. (Applause.)

As the programme of this convention was originally arranged, Mr. J. S. Dennis should have addressed you at this stage of the proceedings. Mr. Dennis has, unfortunately for us, been called east on business, and the executive, for some reason best known to themselves, have selected me to fill his place. This I do not profess to be able to do. It would be difficult for any one of us to adequately replace Mr. Dennis at a gathering of this kind. He framed our first code of water laws, was its first administrator, and has been actively connected with every stage of irrigation development for the past twenty years. While some of you are doubtless recognized authorities on some one or more branches of the work, he possesses such a comprehensive knowledge of the whole subject in all its branches that it is a difficult task for me to attempt at short notice to take his place.

Irrigation, as we have to deal with it, naturally divides into—

- The Law;
- The Administration of the Law;
- Engineering;
- Agriculture.

I do not profess to be an authority on any one of these subjects, but as my experience for a good many years has been acquired in administrative work, I have thought it fitting to confine myself to the subject with which I am most familiar. I have, therefore, called my paper—

‘SOME PROBLEMS IN IRRIGATION ADMINISTRATION.’

The increasing public appreciation of the value of water, and the now very general recognition of the necessity for sound laws to regulate its diversion and use, is my excuse for inflicting upon you a somewhat sketchy paper dealing with some of the problems encountered in attempting to administer any water law.

The fundamental principle of a sound and useful code of water laws is government ownership and control of the sources of supply. Closely allied to this is the control of the rough, forested areas where most of our streams have their sources. Provision is made in the Irrigation Act for government ownership of water and in the Forest Reserves and Parks Act for the control of the watersheds. We thus have the foundation for a sound administration of our code of water laws.

Public ownership of water should, I think, be understood as the holding in trust of a part of the common heritage of the people in order that it may be so administered as to afford the greatest possible good to the greatest number. I do not understand government ownership as vesting in the government, whether Dominion or provincial, any preferred right to the use of water, but rather that any rights to be used by the government should be acquired in strict conformity with the laws applicable to the acquisition of similar rights by any person or company. For example, if the Crown, as represented by any branch of the Dominion or provincial government, desires to use water for public purposes, or for any purpose upon Crown lands, a record should be made against the stream, or other source of supply, in precisely the same manner as when a similar right is sought by any person or company. Unless this is done and a complete record is kept by that department of the government which is charged with the administration of the water laws, no grantee of water can be assured of the priority and value of his own rights. In other words, the Crown is not above the law, but is bound by its own laws to just the same extent as are its subjects. Unfortunately, a contrary view has sometimes been held by some governmental officials, and I have mentioned the matter chiefly with a view to securing an expression of opinion from some of you who have had wider experience than I have.

BENEFICIAL USE OF WATER.

Grants of rights to the use of water under the Dominion Irrigation Act are based upon 'beneficial use,' although that expression cannot be found in the Act. The principle laid down in the United States Reclamation Act that 'beneficial use shall be the basis, the measure and the limit of the right to use water' is the basis of most of our present day water laws. Water rights are granted only when it is believed that the water can and will be used beneficially. Only such quantity is granted as can, or should, be used beneficially, and when the grantee ceases to so use the water his rights should be cancelled.

One of the most perplexing and vexatious questions to be dealt with in the administration of water laws is the determination of what constitutes beneficial use. When water is used for domestic or industrial purposes, as defined by our laws, there is little difficulty, although differences of opinion sometimes arise as to the quantity of water actually required. When, however, water is to be used for irrigation, there is room for endless friction between water users and those whose duty it is to administer the laws.

Irrigation is unquestionably beneficial in districts where the rainfall is insufficient or does not occur in sufficient quantity during the growing season, provided the climatic and soil conditions are suitable for crop production and the water can be applied in sufficient quantity and at suitable times. There is room for a good deal of honest difference of opinion respecting all these conditions.

We are fortunate in Canada in having no large areas of arid land, or even of semi-arid land; we prefer the term 'sub-humid,' which means just the same, but sounds better. On our small areas of really arid land we have so far been unable to supply water for irrigation except on very small tracts and only during the brief spring freshets. Where water is available in sufficient quantity there has recently developed a somewhat widespread belief that irrigation is no longer necessary; that the climate is changing. It is admitted that we had a succession of dry years a decade or so ago, but the rainfall during the past few years—with the exception of 1910—has been unusually abundant, and many people believe that the change is likely to be permanent. It remains to be seen whether or not this belief is well founded. It may be admitted that some climatic changes result from settlement and cultivation, but whether these have any permanent effect upon the volume or distribution of the annual rainfall is extremely doubtful. One of the most competent of observers, Major Powell, formerly at the head of the United States Geological Survey, has said, 'nothing that man can do can change the climate,' and I am inclined to agree with this statement in so far as rainfall is concerned.

STORAGE OF WATER.

But, while we probably cannot appreciably increase the amount of rainfall, we certainly can, and should, more fully utilize what we have. By means of storage we can utilize enormous quantities of water which now go to waste during freshets, thus bringing under cultivation large areas now of little value and increasing the yield on other areas. Very little reservoiring for irrigation purposes has yet been done in Alberta or Saskatchewan, but investigations are now being carried on by the Irrigation Branch of the Department of the Interior with a view to the location of reservoir sites and defining approximately the tracts of land upon which the stored water can be used.

The cost even of the survey work, if carried out on a sufficiently comprehensive scale, will be heavy, and should it be found desirable to actually construct reservoirs at public cost, it is at present impossible to even estimate the cost. It can, however, be confidently predicted that even a very great expenditure of public funds would be amply justified by the prevention of loss of property from floods, quite apart from the increased area of land brought under cultivation.

I am, of course, not in a position to say whether or not this work will be carried on by the Dominion Government on such a scale as has sometimes been suggested by some members of this association. That is a question of policy that will doubtless be dealt with in due time by those who are responsible for the development of the resources of the country and for the expenditure of the revenue. I do know, however, that the Minister of the Interior is fully alive to the growing needs of the West, and I am confident that any practical recommendations made by this association will have his support.

DOMINION IRRIGATION ACT.

The Dominion Irrigation Act was considered at the time of its enactment, in 1894, a pretty advanced bit of legislation and quite the equal of any code of water laws then in force on this continent. It was purposely made very general in terms,

so as to be sufficiently elastic to accommodate itself to changing conditions in the development of the West. The Act was revised in 1898 and has since been further amended, but its essential features remain to-day as when first enacted.

The increasing use of water and the recognition of its value have recently brought up quite a number of questions not fully nor satisfactorily provided for, and it has now become quite apparent that the Act should again be revised so as to meet the changed conditions.

PREFERRED RIGHTS.

Rights to the use of water may be obtained under the provisions of the Irrigation Act for 'domestic, industrial, irrigation or other purposes,' but it is by no means clear that these uses are to be given preferential treatment in the order named. This uncertainty should be cleared up. Another class of water rights should also be added, viz., 'municipal,' and the relative importance of these several uses of water should be defined and given priority by law.

DRAINAGE.

A further amendment is required in order to vest in the Minister adequate power to order the construction and to provide for the maintenance of drains on irrigated tracts. The law at present is adequate in so far as licensees of water are concerned, but makes insufficient provision for the control of water users who are lessees of water from licensees. I assume that there is no difference of opinion among members of this association as to the necessity for drainage in order to dispose of the surplus water and seepage on irrigated tracts and to prevent the lower-lying lands from becoming water-logged.

Some lands are so situated with respect to subsoil and slope that they drain naturally, and the owners are very reluctant to admit responsibility for the water-logging of adjacent lands not so favourably situated. Many perplexing problems are certain to arise when an attempt is made to compel all water users to make adequate provision for drainage, but the attempt must be made and the question of the necessary amendment to the Act and the framing of workable regulations are now receiving attention.

ROTATION IN USE OF WATER.

There are other problems quite as important as those I have mentioned which do not, however, require any amendment to the existing law; they can be dealt with by regulations made by the Minister under the general authority vested in him by section 54 of the Act. Among these are rotation in the use of water and the size of the irrigating head which each water user should receive in order to utilize to the best advantage the total quantity of water which he is entitled to use during the irrigation season. These two naturally go together, and recent developments in this province indicate that they must be dealt with without delay.

Little attempt has so far been made to regulate the use of water by licensees. Irrigators have generally used water when and how they wished, and the quantity used has generally been limited only by the size of the ditch and the desire of the

irrigator. This condition cannot, however, continue indefinitely. When our streams become loaded to their fullest capacity and when all licensees are in a position to fully utilize their water rights, rotation will become a necessity, and with rotation will naturally come the use of larger quantities of water for shorter periods. This can, of course, be handled by the water users themselves through some system of co-operation, after the necessary regulations have been made by the Minister, but it is quite probable that some measure of governmental supervision and control will be necessary, at least for the first few years. There must be some give and take on the part of the water users. Each licensee cannot reasonably expect to receive water just when he wants it. Each must show some consideration for the rights of others using water from the same source, and such a system can only be successfully operated when the irrigators unite for their common benefit.

CO-OPERATION.

This form of co-operative management naturally suggests the desirability of co-operation in the construction of canals to serve lands which the individual owners cannot irrigate by separate systems at their own expense on account of the high cost of the necessary works. Very little such work has so far been attempted. The best example I know of is one on the Frenchman River, south of the Cypress Hills, where four separate projects have been united. In this case, the land nearest the point of intake could have been irrigated at moderate cost but for the fact that a rather costly dam was required to hold the river during floods. The other lands lay farther down the valley and could best and most cheaply be irrigated by an extension and enlargement of the original ditch. The cost of any other system was practically prohibitive. As the persons concerned had been neighbours for several years and were on friendly terms—as neighbours should be in sparsely settled districts—they had little difficulty in reaching a mutually satisfactory agreement whereby each paid his fair share of the cost of the works above his own land and pledged himself to bear a stated proportion of the cost of maintenance. These works are practically finished and some portions of the tract have been irrigated, although the license has not yet been issued. The co-operative arrangement has worked very well so far as I know, and should continue to work well as long as the lands are held by the present owners. The sale of any portion of a tract irrigated under such agreements might cause friction.

There are other districts in which the interests of intending irrigators could best be served by some such arrangement, but on account of the settlers being comparative strangers to one another it is difficult for them to get together. I hope to see a considerable development of this form of co-operation within the next few years, and believe that it will tend towards the construction of better designed and more substantial works and will pave the way for that co-operation on a larger scale which must follow the completion and operation of the larger projects now being developed by companies.

THE PRESENT SITUATION.

Not very long ago I read in a popular magazine an article entitled, 'What is the matter with Irrigation?' The writer did not satisfactorily answer his own question; he merely pointed out some of the present-day difficulties without suggesting any

adequate remedies. It is always easier to criticize than to suggest better methods.

Irrigation development seems to be passing through a crisis. Mistakes have been made and someone must pay for them. Usually the purchaser of irrigable land pays for the errors of the promoter or the engineer and he does not at present appear disposed to pay without protest. Even projects initiated, constructed and operated by government are not exempt from criticism.

In the United States the operations of the Reclamation Service have been widely criticized, and have been the subject of inquiry by congressional committees and boards of engineers. Very recently an inquiry was ordered by Congress into the working of the Carey Act, under the provisions of which large areas of land have been handed over to several of the western states for reclamation under state supervision.

The carrying out of projects providing for the irrigation of from fifteen to twenty or more million acres of land under the provisions of the Reclamation Act and the Carey Act could not readily escape criticism. Mistakes, more or less serious, could not well be avoided in works costing approximately one hundred million dollars. The really surprising feature of these investigations is that they have revealed so little that is really wrong, particularly with respect to the work carried out by the Reclamation Service. The Carey Act projects have not escaped quite so well.

In British Columbia, the bringing into practical effect of the new code of water laws has necessitated a complete adjudication of all water rights, or claims to water, within that province, and this will inevitably be a work of great difficulty and productive of much criticism from those whose claims must be reduced in volume or altogether cancelled.

In Alberta we find a numerous group of water users protesting to the government that they have been deceived by the company from which they bought land and which owns and operates the irrigation system upon which they are dependent for water. A very searching investigation is now under way for the purpose of determining the precise conditions within this irrigation tract, and substantial justice will be done not only to the water users but to the operating company as well, for companies as well as individuals have rights which must be respected and protected.

There is evidently a rather widespread feeling of dissatisfaction with existing conditions, and changes of some kind will doubtless result. Is government ownership and operation of the larger irrigation projects to be the ultimate condition in this country? This has sometimes been suggested as the remedy for the present difficulties, but is it really likely to prove so? As I have already said, it is easier to point out the existing problems under the present systems than to suggest any adequate solution of them, and I fear that, for the present at least, I must follow the example of the writer of the magazine article to which I have referred. That government ownership and operation would be honest and reasonably efficient may safely be assumed, but it appears to me that co-operative ownership by the water users offers a more satisfactory remedy. This is to be the ultimate condition under both the Reclamation and the Carey Acts when a sufficient proportion of the lands comprised in each of the several projects shall have been disposed of.

It is not to be expected that immediate satisfaction will result from the taking over of these irrigation systems by the water users—that their troubles will at once

cease. On the contrary, the difficulties are rather likely to be intensified for a time until, through much tribulation, water users learn to deal with others as they would themselves be dealt with. (Applause.)

CHAIRMAN.—We have ten minutes for discussion, and should like to hear from any who are interested in this important question.

Mr. PEARCE.—Mr. President, ladies and gentlemen, there are one or two subjects brought out in that address that I think considerable attention must be given to, and in my individual capacity I would refer to one—the necessity of securing all information possible regarding the storage of water. Having obtained that information, the next question should be how to provide it and when.

My attention has been more particularly directed to the storage of water on the Bow river and its tributaries. Not only would it be highly beneficial for irrigation purposes but I have often considered that the outlay would be justified in preventing the destruction which arises owing to flood conditions in those streams. The same observations also are more or less applicable to all our mountain streams of any size.

Another subject mentioned, and one in which I have long been a believer and advocate, is that it is the duty of the government to decide what lands water should be applied to. I think there is a great waste of valuable material through the application of water to unsuitable land, and I think the time is fast approaching when some investigation of that particular subject should be carried on, and some regulations provided in connection therewith. Anyone at all familiar with the subject of irrigation can call to mind readily, districts in this country where the same volume of water applied on one particular quality of soil, and under even conditions would produce three to seven times the benefits it would on others. (Applause.)

CHAIRMAN.—Is there any other delegate who wishes to speak?

Mr. JENNINGS.—There is one question in the early part of the paper regarding the priority of applicants on streams. Mr. Drake mentioned the fact that the government can step in and take up water on any source of supply without filing an application or without being licensed. If that is the case, it appears to me that on a stream where a great number of applications are already registered and the water is already appropriated, that if the government can step in and take some of that water, some of these already licensed schemes would suffer, and I would like to know from Mr. Drake the standing of the government. If that is the case, some recognized filing of their claims for water should be made in the usual way and the amount of water required should be registered against the streams in the usual way, as in the case of the ordinary applicant. I think this convention should register a protest against such a course.

Mr. DRAKE.—My understanding of the matter, Mr. Chairman, is that the government is acting as trustee for the people, but it does not seem to me that the government has any preferred right to that water, and whether as a matter of law or policy it seems that the government should record its application for water in just the same manner as an individual, because only in that way can a continuous record be kept of all applications in order of priority. There must be some one place where all these applications are recorded and dealt with. In such a case, however, as Mr.

Jennings has brought up, if the water is already granted, I take it that the government would not step in later and attempt to take away any water without compensating the people from whom the water is taken.

Mr. JENNINGS.—My criticism was that the government should register an application and have the amount of water filed against the stream.

Mr. DRAKE.—Yes, I think so.

Mr. JENNINGS.—Even if they have to expropriate, they should file their application first.

Professor LYMAN.—It seems to me the question that has just been asked involves two things: the state or the government may apply for water for its own use, that is one case; but if I understand the fundamental thing in the law, it is this, that the state has a right to all the water in the beginning and allows the people only to use the water. For example, on a river I have in mind the state has a reclamation project in hand and applied for a certain quantity of water. It makes application just the same as an individual, but on the other hand, the state holds all the water just the same as all the land. The people apply for the land until it is exhausted and, too, the people apply for the water until the water is exhausted. There is this difference, however, between land and water, that the water is a varying quantity and the land is a fixed quantity. I would like to ask Mr. Drake now in this connection. On a stream that fluctuates, if I am willing to make application to-day as the tenth applicant, for instance, would all of my application there be granted if only in one year in ten I would get any water? In other words, should there come a time when the government will refuse to grant an application for water on a stream?

Mr. DRAKE.—I think you have asked two questions, Mr. Lyman. In the first case you said if all the water of the stream had already been appropriated and a man submitted an application for water, and the government thought that perhaps only in one year in ten there would be any water available, should the application be granted? Well, it seems to me that it should be granted if the government was first of all assured that the applicant himself thoroughly understood the situation.

In the second case, you suggest, however, should there ever come a time when the government would refuse applications for water? I think assuredly a time must come when applications must be refused. Assume a case, for example: if there had been one abnormal flood within the last forty years, I don't think the government would be safe in granting flood water applications up to the maximum of water for that one year.

Mr. WALTER HUCKVALE.—Mr. President, I have listened with a good deal of appreciation of what Mr. Jennings has said, and I think his remarks are particularly applicable to the case of the Cypress Hills Water Users' Association. Most of the streams in use there have not a constant flow of water, *i.e.*, they only flow in certain periods of the year, and I can well understand, and have instances that I can remember, of where an original applicant and licensee of water had that privilege taken away from him by reason of a certain town or railroad requiring water for their own use, and I think there is no doubt in the minds of all fair-thinking men

that after the government has granted a license for water to a certain applicant, if there is any reason in the public interest that that license should be taken away, compensation should be made. (Applause.)

CHAIRMAN.—Gentlemen, I have now much pleasure in introducing to you Dr. J. G. Rutherford, Superintendent of Agriculture and Animal Industry Branch of the Canadian Pacific Railway.

DR. J. G. RUTHERFORD.—Mr. President, ladies and gentlemen, this subject has never received the attention at the hands of the Canadian people or the government that it was properly entitled to, and if I can do anything this afternoon to interest you in the International Institute of Agriculture I think the time will probably be well spent, and I hope you will have the same opinion in the long run yourselves.

THE INTERNATIONAL INSTITUTE OF AGRICULTURE.

Perhaps the most remarkable feature of the new life which, since the discovery of steam power and the consequent continual and cumulative development of commercial and industrial activity, has become general throughout the world, is the subordination of agriculture from its proper place as the head and front of all human activity to a position in which it is regarded, at least by most unthinking men, with a careless toleration, in some cases bordering on contempt.

That, under modern conditions in civilized countries, the masses have largely lost sight of the importance of agriculture as the primal factor in human affairs, is evidenced in many different ways.

Among these may be mentioned the constant and ever-increasing trend citywards, as shown by the growing preponderance of urban over rural population; the tendency of the farmer's son to abandon agriculture for commercial pursuits or for one or other of the so-called higher professions and the superior attitude unwarrantably assumed by many city dwellers towards their country cousins.

Even in these great western provinces, where agriculture is and will always continue to be the leading industry, we find in our urban communities a woeful lack of proper perspective in this regard.

This is shown by the tendency to build up and develop, largely through artificial means, cities and other centres of population without any apparent regard or consideration for the welfare or interests of the tillers of the soil in the territory tributary to these centres, and on which they must of necessity depend for their future maintenance and support.

In the hurly-burly of present-day life, the farmer would appear to be a scarcely considered factor, although, without him and his produce, the wheels of commerce would not revolve for a single day, while if farming operations throughout the world were suspended for but one week our whole commercial and industrial fabric would fall to pieces, and it is best not to think what would happen to the so-called 'giants of finance.'

While the masses are thus too generally prone to ignore, or rather overlook, the importance of the farmer, it is fortunate that in all civilized communities there is to be found a different element, consisting of intelligent and thoughtful men who

devote their lives and energies to the betterment of agriculture and the improvement of agricultural methods both scientific and practical.

It may be laid down as a general rule that the more highly civilized a country is, and the more fully developed its agriculture, the greater is the consideration shown towards those engaged in this pursuit.

The personal verification of this statement would lead to many surprises among those unfamiliar with agricultural conditions in the older countries of the world.

Those of us who have watched the growth of settlement on these western prairies have often observed the mutual benefit derived from the commingling in close neighbourhood of tillers of the soil from many different lands. The almost unavoidable interchange of ideas and the comparison of different methods of doing certain things, gradually, if almost insensibly, lead to the adoption in such a community of a much higher composite standard than can be found in districts peopled by settlers of common origin.

The remarkably rapid advance in agricultural science which has taken place in the newer districts on this continent, especially during recent years, is unquestionably largely attributable to this commingling of the ideas of people from different countries, and when it is borne in mind that but few of our immigrants are derived from the classes in which the greatest mental development and the highest training exist, it goes without saying that a universal interchange of agricultural knowledge would be of inestimable value to farmers throughout the world.

We all know that if in any community farmers stand aloof and fail to meet with each other for the discussion of matters of common interest, but little advancement is made, while in those districts where farmers' clubs and institutes flourish, the trend is in the direction of greater progress and prosperity.

In the same way, the province or state which devotes the most attention to agricultural education and the general spread of agricultural knowledge, very soon begins to derive direct and tangible benefit from this policy, and the same is true of those central governments which are sufficiently broad and far-seeing to make the knowledge and experience of their various component parts available for the benefit of all.

In this connection, too much cannot be said in appreciation of the magnificent work achieved by the agricultural press, constantly engaged as it is in an active propaganda of useful knowledge steadily increasing in scope as well as in value.

As a rule, however, these various agencies have their limitations, inasmuch as the information which they disseminate is local, or at best, national in character, and in this respect agriculture has until lately lagged behind almost every other line of human endeavour.

From the beginning of time, students of theology throughout the world have endeavoured with more or less force and fervour to impress their views upon each other; the scientists of all countries have long been in the habit of exchanging ideas, while that fine field for the imagination, international law, has been, and still is, a profitable source of revenue to the legal profession. In the industrial world, and in mercantile life, knowledge practically ignores national lines, while in the realms of finance we western forelopers have from time to time painful reminders that the supply of ready cash is controlled by the money kings of many different countries.

In this respect, as in many others, however, the farmer is now returning to his own. I use the word 'returning' advisedly because from the days when 'Adam delved and Eve span' until the commencement of the period of tremendous expansion which followed the discovery of steam power but little over a century ago, the tiller of the soil was always rightly regarded as the most important factor in the community in which he lived.

Although for a time his importance has been partially obscured by the brilliant achievements of those whom he has all the time been feeding, he has recently again asserted his eternal right to the leadership of humanity.

When less than a decade ago that remarkable man, David Lubin, of California, stirred to action by the realization that, through the manipulations of speculative corporations and individuals, the farmers of America and of the world at large were being yearly robbed of a large proportion of the just returns from their labours, set his keen intellect to work to devise a remedy, even he could scarcely have anticipated the tremendous nature of the agencies which it was to be his lot to put in motion through the organization of the International Institute of Agriculture.

His original conception was merely a universal crop reporting bureau, to be established on lines similar to those already existing in many individual countries. This he foresaw would eventually render impossible the market manipulations of those persons who for years had been making it their business to secure advance information relative to the supply and demand of agricultural produce throughout the world.

This great project was submitted by its determined and persistent originator to one after another of the leading governments of the world, only to be rejected as Utopian and impracticable, not to say impolitic, and it was not until he succeeded in gaining the ear of His Majesty, King Victor Emmanuel of Italy, that he received any encouragement.

The details of the first memorable interview between His Majesty and citizen Lubin are interesting to a degree, but are best reserved for private recital. Suffice it to say that the King at once took the matter in hand, and after repeated interviews and careful consideration of the whole scheme, issued an invitation to all the governments of the world to send representatives to Rome to discuss the formation of—

'An international institution absolutely unpolitical in its aims, which would have before it the conditions of agriculture in the different countries of the world, which would give notice periodically of the quantity and quality of the crops on hand, and promote their production, facilitate their sale and encourage a more favourable settlement.

'Acting in unison with the various agricultural bodies now in existence, this institution would furnish reliable information as to the demand and supply of agricultural labour in various parts of the world, so as to provide immigrants with a safe and useful guide; it would make possible collective defence by the nations against diseases of plants and domestic animals, which, as a rule, cannot be successfully fought by means of partial action; it would also encourage the development of societies for rural co-operation, agricultural insurance and agrarian credit.'

This invitation was accepted by forty sovereign powers and the delegates chosen by them met at Rome in June, 1905.

These representatives were men of high standing in their respective countries.

The delegates from Great Britain were the Earl of Minto, the Earl of Jersey, Sir Thomas Elliott, then Permanent Secretary of the British Board of Agriculture, Mr. T. P. Gill, Permanent Secretary of the Board of Agriculture and Technical Institution for Ireland, and Sir Edward Buck, representing the Government of India.

The discussion was of the fullest and most interesting character, and while the delegates naturally failed to agree on every point, they were unanimously in favour of the establishment of an International Institute of Agriculture to be charged with the duty of carrying out the project outlined in His Majesty's invitation.

Several European countries which had experienced more or less agrarian agitation proposed that the more powerful agricultural organizations should be entitled to representation in the Institute. This, however, failed to meet with the approval of the majority, as the Institute, being a state organization, must of necessity be composed of delegates deriving authority from their respective governments and acting under their control.

The membership was divided into five classes or groups, and it was agreed that the membership fee for these groups should, at least for the first two years, be as follows:—

Countries composing the first group to pay an annual subscription fee of 24,000 francs (\$4,800) and to have five votes.

Countries composing the second group to pay an annual subscription fee of 12,000 francs (\$2,400) and to have four votes.

Countries composing the third group to pay an annual subscription fee of 6,000 francs (\$1,200) and to have three votes.

Countries composing the fourth group to pay an annual subscription fee of 3,000 francs (\$600) and to have two votes.

Countries composing the fifth group to pay an annual subscription fee of 1,500 francs (\$300) and to have one vote.

Provision was made that, in cases where a larger subscription was found necessary, the annual fee for the first group might be increased to 40,000 francs (\$8,000), which, following in the same ratio as above, would call for an annual subscription fee from the fifth and last group of 2,500 francs (\$500).

Canada was originally placed in the fourth class, but on my advice was, at the November meeting in 1908, advanced to the second class.

During the conference, convincing evidence of the enthusiasm and generosity of the King of Italy was furnished by the announcement that he had endowed the Institute, from his own personal revenues, with 30,000 lire or \$60,000 a year, and that, pending the completion of the organization, this fund would be devoted to the providing of a suitable home for the Institute in the Eternal City.

Among the other matters dealt with at this conference and embodied in the protocol prepared for ratification by the governments of the various adhering countries, was the preparation of a constitution for the Institute.

This document as drafted provides for a periodical General Assembly of agricultural, diplomatic and other representatives from the various adhering countries and for a Permanent Committee, to which these countries have the right to send one delegate empowered to cast the entire number of votes to which his country may be entitled.

The representation of any country on this Permanent Committee can be deputed to the delegate of another adhering country on condition that the actual number of members in attendance is not less than fifteen.

Although no limit is placed on the number of representatives which may be sent by any government to the General Assembly, it is provided that, in this body also, each country shall cast only the number of votes to which it is properly entitled in point of classification.

The General Assembly is the governing body, having the right to approve or disapprove of any detail of the programme prepared by the Permanent Committee with reference to the organization or internal economy of the Institute.

It is charged with the ultimate control of all expenditures and the authorization of the budget prepared by the Permanent Committee, as also with the responsibility of presenting to the adhering governments, for their approval, all modifications of any kind involving increase of expenditure or extension of the powers of the Institute.

The General Assembly is empowered to fix the dates for the holding of its own sessions and to lay down its own rules of procedure, but in order to render its deliberations valid, there must be present at each meeting delegates representing at least two-thirds of the votes of the adhering countries.

The executive powers of the Institute are entrusted to the Permanent Committee, which, under the direction and control of the General Assembly, prepares all matters for the consideration of that body and puts its deliberations into effect.

The Permanent Committee elects, from among its members, for a period of three years, a president and a vice-president, who are eligible for re-election, makes its own rules of procedure, votes on budgets of the Institute within the limits of the sums placed at its disposal by the General Assembly and appoints and dismisses employees.

The secretary general of the Permanent Committee performs the duties of secretary of the General Assembly. The protocol also stipulates that the Institute is to be strictly international in its scope, and that all questions relative to the economic interests, legislation or administration of any particular country are to be excluded from its sphere.

It also carefully defines and delimits the operations of the Institute and specifies the exact lines of work in which it may engage.

This protocol was submitted through the proper diplomatic channels of the governments of the various adhering countries and duly ratified by each, but as these negotiations and the selection of suitable delegates occupied some time, it was not until May, 1908, that it was found possible to call the first meeting of the Permanent Committee.

The meeting was held in the magnificent palace which, through the generosity of the King of Italy, had been erected within the grounds of the historic Villa Borghese. This building, which was at the time scarcely completed but which was practically finished for the later meeting, held in November of the same year, is an

exceedingly handsome and commodious structure. From an architectural point of view, it leaves nothing to be desired, while it is sumptuously furnished and decorated throughout with fine specimens of modern Italian art. Its situation is excellent, commanding a beautiful view of St. Peters' and the hills across the Tiber.

Although only sovereign powers were invited to attend the preliminary convention of 1905, that body, on the motion of the British delegates, had agreed that, on demand of the countries to which they owed allegiance, colonies should be admitted to full membership in the Institute.

It thus fell out that, as the first Canadian member of the Permanent Committee, I found myself associated with a small but compact group of British delegates representing the Mother Country and the dominions overseas. These comprised Sir Thomas Elliott, K.C.B., delegate from Great Britain and Ireland, with whom were associated Mr. T. P. Gill, Secretary of the Department of Agriculture and Technical Instruction for Ireland, and Mr. W. G. Adams, also of that department, Honourable (now Sir John) Taverner, delegate from Australia, and Sir Edward Buck, K.C.S.I., delegate from India.

New Zealand and Mauritius, although adhering, had no representatives present on this occasion.

Mr. David Lubin represented most befittingly, as he has since continued to do, the great Republic to the south of us.

The following countries were also represented each by one individual delegate: Italy, France, Germany, Austria, Hungary, Russia, Norway, Sweden, Denmark, Belgium, Holland, Switzerland, Spain, Portugal, Servia, Bulgaria, Roumania, Montenegro, Egypt, Mexico, Costa Rico, Argentina, Ecuador, Cuba, Chili, China, and Japan. Thirty-two delegates, representing as many countries, were actually present, and although this number has been largely exceeded at almost every meeting since held, the occasion was one practically without precedent. I do not expect that it will ever fall to my lot to attend, at least upon this earth, a more remarkable gathering. Perhaps the few days which preceded the actual opening of the Institute were the most interesting. As is usual when many men of many minds, and especially of many nations, meet to discuss an important matter of common interest, there were many opinions and many points of view. The natural tendency to divergence of thought and expression under such circumstances was in this case intensified by the fact that the scheme under review was of so extraordinary a character.

There was much hard thinking by thoughtful men differing widely in training and previous environment, and in addition, largely influenced by national considerations. Under such conditions it is not surprising that there were many different conceptions of the future work and well being of the International Institute of Agriculture.

Ideas were in the melting pot, and although the furnace was not yet in full blast, the process of fusion had already begun.

Conferences were constantly being held and discussions more or less animated, according to the national temperaments of those taking part, were everywhere in evidence.

It was soon apparent that, unless the delegates of the greater nations could be brought to agree upon some line of policy reasonably definite and mutually satisfactory before the actual meetings began, there would be more argument than action and

but little hope of a logical outcome. Fortunately for all concerned, the delegates from the larger and more important countries were, almost without exception, men of sound sense and good judgment.

This being the case, compromise became the order of the day, and by giving here and taking there, the adoption by these gentlemen of a general policy, so far at least as the initial steps were concerned, was soon rendered possible.

The Institute was formally declared open by His Majesty the King of Italy, on May 23, and the first meeting of the Permanent Committee took place on Monday, May 25. Meetings were held either once or twice daily until June 6, and although at times the discussions, which were all conducted in French, this being the official language of the Institute, were somewhat protracted, and at times rather more animated than is usual among the placid Anglo-Saxon peoples, excellent progress was made in the work of preparing rules of procedure, deciding on the exact character and scope of the Institute and arranging all details relative to staff, salaries, discipline and like matters.

A commission of eight members was entrusted with the completion of this task, and on June 5 an adjournment was made until the following November.

The Permanent Committee, which on this occasion comprised a number of new delegates from countries not previously represented, reassembled in Rome on November 16, 1908, and after electing its officers in accordance with the terms of the protocol, took up and discussed the report of the sub-commission of eight, which, after some slight amendment, was finally adopted.

This report was later presented to the General Assembly, which met for the first time on November 28.

The meeting of this General Assembly, which may be termed the ornamental branch of the Institute as contrasted with the Permanent Committee, which is its working force, was a most impressive gathering, comprising a large number of the most prominent agriculturists of the world, as also many statesmen and diplomats of high rank.

After electing officers and laying down rules of procedure, this dignified assemblage spent considerable time in discussing the report of the Permanent Committee, which it finally approved, subsequently adjourning with much ceremony.

I do not think it would be either proper or profitable to attempt to deal with the report of the Permanent Committee in detail. Suffice it to say that it provided for the appointment of three separate and distinct sub-committees to be elected by the Permanent Committee from among its own members.

The first of these sub-committees was charged with the management and routine of the Institute, the second with the collection and publication of agricultural statistics and information relative to diseases of plants, the third with the study of agricultural labour, co-operation, insurance and agricultural credit.

The report dealt with a number of other matters of minor importance. The provisions for the appointment, control, remuneration and retirement or superannuation of the working staff of the Institute itself, comprising the secretary general and his assistants, chiefs of divisions, librarians, chiefs of sections, editors, clerks, translators, stenographers, messengers, caretakers, and even the elevator men, were elaborated most minutely, but time will not permit of their discussion here.

I have now outlined the history of the organization of the Institute at what may seem to you unnecessary length, but in reality, very briefly, in view of the obstacles which had to be overcome in securing harmony of thought and action among so many individuals differing widely in origin and training.

The success achieved in this regard is evidenced by the unanimity with which the report of the Permanent Committee was officially adopted by that body. The equally fine spirit in which it was received by the General Assembly is truly remarkable when we consider that the occasion was without a parallel in the history of the human race.

Never before since the beginning of time had representatives from practically every country under the sun met, as had these delegates, day after day at the same table to discuss together the establishment and operation of a joint office, to be conducted on modern business lines by a partnership comprising the world at large.

In order to be able to comprehend the magnitude of the task so well performed by the Permanent Committee in preparing this report, one must almost have been present at its meetings.

During the earlier sessions, the more practical members who believed that the Institute could, if properly organized, be made to render most effective services to agriculture, had often cause to fear that the restrictions imposed by the State Convention of 1905 would result in making it what many of the diplomats in attendance only too evidently desired that it should be, namely, a formal, ineffective and useless statistical bureau.

Only by the fine courage and enthusiasm of David Lubin, its original founder, and the gentle strength and excellent judgment of Sir Thomas Elliott, backed as these were by a few hard-headed men, who from day to day gained both in numbers and influence, was it finally possible to overcome the bureaucratic element and make the Institute what it is to-day, a live factor in the agricultural and commercial life of the world.

As was only to be expected, the difficulties of the new undertaking did not cease with the completion of its formal organization. The Permanent Committee had still before it an arduous task in the selection and appointment of the various members of the official staff, gathered as these had to be from many different countries.

Every effort was made to secure the best available talent, but as can be readily understood, many of the men best qualified for the work did not care to take up their permanent residence in Rome, while the scale of remuneration offered, although equal to or even slightly higher than that prevailing in most parts of Continental Europe, was scarcely sufficient to induce persons of this class to expatriate themselves.

The question of language was also an obstacle, and although the Institute has now for some time been working smoothly and with few changes in its official personnel, such changes were not infrequent during the first two years of its existence.

There have also been not a few changes in the personnel of the Permanent Committee, but many of the original members are still to the fore. My own official connection with the Institute ceased in November, 1908, as it was, of course, impossible for me to permanently reside in Rome and at the same time carry out the duties of the official position which I then held in this country.

Canada has not, for some time, had a regular delegate on the Permanent Committee, her representation being now entrusted to an attaché of the British Embassy

in Rome. Nor, in marked contrast to the other adhering countries, has she at present connected with the Institute a representative familiar with her actual agricultural conditions. This, to my mind, is greatly to be regretted, as is also the fact that the authorities at Ottawa have never really grasped the great potentialities of the Institute, as evidenced by the attitude of Canada towards that organization since 1908.

A good deal of formative work was done in 1909, but it was really not until the following year that the Institute got properly under way. One of the first tasks to be undertaken was the investigation of the methods followed by the various adhering countries in regard to the collection of crop reports and agricultural statistics in general with special reference to the reliability of the information thus obtained.

Very satisfactory progress has been made in standardizing reports of this nature, and although perfection has not yet been attained, a marked improvement has been effected in many of the adhering countries. Under the system at present followed, but which it is the intention to improve and extend as rapidly as possible, full reports are forwarded by the various governments to Rome, so as to reach the Institute in time to permit of their publication in the regular Statistical Bulletin issued in English, French, German, Spanish and Italian about the 20th of each month.

In addition to this full monthly report, news is constantly being received by the Institute from the various governments.

When this is deemed sufficiently important, it is rapidly translated into the languages above mentioned, being those most commonly used throughout the world, and corresponding adjustment made in the weights and measures, as also the money terms used. This is then forwarded by telegraph or cable to all the adhering countries.

It is gratifying to know that the work of the Institute in this connection has shown a steady improvement, until to-day its figures are quoted as both reliable and authoritative.

In the other lines of work undertaken by the Institute, the progress made has also been very gratifying.

With only such slight modifications as were from time to time found necessary in actual practice, the plan of the organization adopted by the Institute in 1908 was followed until May, 1911.

At the meeting of the General Assembly then held, Sir Edward Buck, the delegate for India, who has been associated with the Institute ever since the preliminary meeting in 1905 and who is an exceedingly able man of large experience, succeeded in bringing about a change which he had long advocated, namely, the creation of a special division of agricultural intelligence and diseases of plants.

Under present conditions, therefore, the Institute comprises the following divisions:—

- (1) Management.
- (2) General Statistics.
- (3) Agricultural Intelligence and Diseases of Plants.
- (4) Economic and Social Institutions.

The Division of General Statistics deals with the following subjects:—

Agricultural Statistics.—Inquiry, collection and publication of agricultural information and statistics relating to animal and vegetable culture and production.

the trade in, and distribution and consumption of agricultural produce; market prices and stocks of agricultural produce; general and special fluctuations in agricultural produce; markets, sales, fairs, &c., and interpretation and comparison of various statistical data.

Collection of finance and customs statistics relating to agricultural produce; imports and exports; daily, weekly and monthly agricultural statistics; general statistics; special periodic and occasional statistics; statistical departments of each country, &c.

The Division of Agricultural Intelligence and Diseases of Plants deals with:—

(a) *Agricultural Information*.—Inquiry, collection and publication of practical information relating to animal and vegetable culture and production; inquiries and monographs regarding vegetable and animal produce; collection and abstraction of various periodic information as to the agricultural situation in every country.

(b) *Plant Diseases*.—Distribution and prevalence of disease; remedies; destructive pests; entomology.

The Division of Economic and Social Institutions deals with the following matters: Wages of agricultural labour; statistics and information concerning the organization of agricultural co-operation, insurance and credit.

The following bulletins are now issued regularly by the Institute:—

- (1) A monthly Bulletin of Agricultural Statistics.
- (2) A monthly Bulletin of Economic and Social Intelligence.
- (3) A monthly Bulletin of Agricultural Intelligence and Plant Diseases.

Of these the statistical bulletin already mentioned supplies in a tabular form information as to the area, production and condition of the crops of wheat, rye, barley, oats, corn, rice and cotton in the principal producing countries of the world, based on the official information supplied to the Institute. Supplements to the bulletin are issued from time to time containing the news received by the Institute between the regular monthly issues, and the results of any census of live stock which may be taken in any country are also published as soon as they are available.

The information furnished by this bulletin, coming as it does from official sources, is unquestionably the best guide which has ever been made available for the use of farmers and others whose interest it is to study market probabilities.

While there is still room for improvement, some of the adhering countries not having yet perfected their methods of securing the necessary information, the reports furnished by the Institute are already infinitely more reliable and trustworthy than the unauthoritative and often inspired reports emanating from speculative and commercial sources.

The Bulletin of Economic and Social Intelligence is published monthly in French and provisionally in English. Each issue consists of from 250 to 400 pages, embodying a mass of information relative to the progress of agricultural co-operation, insurance and credit throughout the world.

It is difficult to over-estimate the value of this publication when one considers the extraordinary improvement in the social and economic conditions affecting agriculture which has been brought about in a number of different European countries by the intelligent study, and the equally intelligent application, of the co-operative

principle and the astounding lack of knowledge regarding it which still prevails in other parts of the world.

This bulletin will, however, from this time on provide those interested in the study of agricultural co-operation and kindred subjects with full and exact information as to the progress of the movement throughout the world.

The creation of the International Institute of Agriculture would have been well worth while, even if its only achievement had been the awakening of a more general interest in this vital subject. In this connection, I would say that the American Commission, which has just concluded a tour through a number of the European countries for the purpose of studying co-operative methods in general and co-operative rural credit systems in particular, owes its origin to the interest awakened in these subjects by and through the International Institute of Agriculture.

Mr. David Lubin, the original founder of the Institute was the moving spirit in bringing about the formation of the commission in question, it being the outgrowth of a conference held under the auspices of the 4th Annual Convention of the Southern Commercial Congress, held in Nashville, Tenn., in 1912, and in which twenty-seven states participated.

At this conference, Mr. Lubin explained fully the various European co-operative systems, and in so doing made free use of the publications of the Institute.

Having once started the movement, Mr. Lubin, as is his custom, spared no effort to make this commission a practical success, and that it has been so is already abundantly evident even from the preliminary statements which have appeared in the press as coming from some of the delegates from these western provinces, who fortunately for all concerned were included among its membership.

I deeply regret that, owing to the pressure of my present official work in its formative stages, I could not feel justified in accepting the very pressing invitation extended to me by Mr. Lubin to join the commission as representative of the Department of Natural Resources.

While, owing to my previous acquaintance with many of the men who in Europe are most closely identified with the movement, and my consequent comparative familiarity with it, I might possibly have been of some small use to the other Canadian delegates, I feel satisfied that the full reports of these gentlemen, when available, will, to paraphrase the ancient martyr, 'light such a candle in Canada as shall never be put out.'

The Bulletin of Agricultural Intelligence and of Plant Diseases is published monthly in several languages, including English. The publication is the most complete and comprehensive periodical summary of universal and up-to-date agricultural information which has ever been placed within easy reach of the farmer. It is compiled by shrewd and intelligent expert editors from the carefully scrutinized pages of some two thousand journals treating of agriculture, live stock, forestry, rural engineering, including irrigation, land reclamation and conservation of soils, which are regularly received at the Institute.

Still further information is drawn and epitomized from thousands of bulletins and reports forwarded to the Institute by the various Departments of Agriculture throughout the world and by other scientific bodies dealing with agriculture and related subjects. Each monthly issue of this bulletin contains some 200 pages of

printed matter systematically arranged for easy reference. In it are published for general information any official communications contributed by the adhering governments. In addition to these three monthly bulletins, the Institute publishes weekly in French a Bibliographical Bulletin containing a list of all new books, as well as of all specially noteworthy articles dealing with agriculture and allied subjects which have reached the Institute during the week. Its object is to supply to those interested early information as to current agricultural literature in advance of the more detailed particulars furnished by the monthly bulletins.

The Institute also issues from time to time special publications dealing with its own work from the international point of view.

The regular monthly bulletins can be obtained by any one either directly from the secretary general of the International Institute at Rome or through any reliable bookseller on payment of the following annual subscriptions:—

Bulletin of Agricultural Statistics.	\$1 16
Bulletin of Economic and Social Intelligence.	3 48
Bulletin of Agricultural Intelligence and Diseases of Plants.	3 48

The joint subscription for all three of these publications has been fixed at \$6.96.

The Dominion Government issues monthly a summary of all three, which may be obtained free of charge on application to the 'Publications Branch, Department of Agriculture, Ottawa,' but owing to the delay inseparable from the work of reprinting and reissue, and the condensation found necessary, the original publications are the more desirable.

The finances of the Institute are in a sound and satisfactory condition. Its regular official income is, of course, assured and invariably forthcoming, while the management is not only business-like and capable, but from the fact of its being largely in the hands of European officials, free from the extravagance which is too often seen in connection with the expenditure of public funds on this side of the Atlantic.

The Institute then is established and has made a good beginning in the great work for which it was designed.

Since, as the old story has it, the nations parted at the Tower of Babel in sorrow and confusion, they never again united in a common enterprise until their envoys foregathered in Rome five years ago.

Signor Tittoni, the Foreign Minister of Italy, in closing the Assembly of 1908, did not fail to grasp the significance of the occasion when he said, 'the Assembly may really be called the first session of the World's Parliament,' and as another noted man then present commented, he might have added 'the Parliament of Peace.'

In support of this view, I quote the following from the proceedings of the great Hague Peace Conference held in the same year:—

'Resolved that, as international peace and prosperity depend largely upon economic justice, this congress expresses its satisfaction at the co-operation of all nations of the world in establishing the International Institute of Agriculture, which will perform an inestimable service as a clearing house of economic information that will tend to lessen unnecessary fluctuations in the price of agricultural produce, thereby promoting stability in the capital and labour of the factory as well as the

farm, and resolved that peace societies should call the attention of the world to this important factor in the promotion of international peace.'

It is significant that the man in whose mind the idea of the Institute first originated, and to whose energy and persistence it owes its being, is a scion of that ancient Semitic race which, while ever preserving its identity, so readily adapts itself to the life and conditions of every country of the world.

With the heredity of this great race, tempered by the trials and persecutions of Poland, and stimulated by the free life and freer thought of America, David Lubin was a fitting instrument for the hand of Providence in the inauguration of this new era in human affairs.

It is also significant that, after being rejected by other countries in which it might well have been expected to find a congenial home, the Institute was implanted in Italy, the first of European countries to develop her agricultural resources, and again, the first after the dark ages to revive scientific agriculture and to follow, as she has ever since done, earnestly and closely, its most intensive practice.

The irrigation works designed by that universal genius, Leonardo de Vinci, in the fifteenth century have never been permitted to fall into disuse, and for years experts from every country have been going to Italy to study the methods there in vogue for the use and control of water in the irrigation, as well as in the reclamation, of land.

Again, it is noteworthy that the Institute is domiciled in Rome, that Eternal and many sided city round which cling so many human associations and traditions that, even in these modern and degenerate days, it is without a rival as the Mecca of thoughtful souls.

Once more, this is not only the first universal international institution actually doing business daily under business rules and business management, it is an agricultural institution. In other words, we are back to first principles.

The first real business of humanity was the tillage of the soil, whether we start at the back gate of the garden of Eden or just this side of Darwin's missing link, points of departure possibly not so far asunder as they might at first mention appear.

Most significant of all, therefore, is it that this great new movement which, whether we yet believe it or not, is certain to effect more in the bringing of mankind to a common understanding than anything else that ever happened, is an agricultural movement throughout.

It indicates that the temporary eclipse from which the farmer has suffered, owing to the industrial activity of the last hundred years, is at an end and that agriculture is again being restored to its rightful place in the field of human endeavour.

And we must be just. We must admit that, but for the wonderful facilities in the matters of transportation, communication, publication and many others which we now enjoy and which we owe to that very industrial activity and the genius of invention which gave it birth and bore it company, we would not to-day have the International Institute of Agriculture with all the glorious promise for the future which it holds in store.

The Institute is an accomplished fact, its work has been begun. But there is yet much to do, and if it is to effectively serve its purpose the farmers themselves must take a greater interest in its management.

Its permanence is assured, it is supported from the public treasuries of half a hundred world powers, and it goes without saying that, established as it is by formal state convention, it will continue to exist and to collect and disburse these revenues.

Under these circumstances, it is the plain duty of the farmers of every subscribing country to see to it that they get value for their money. They should not only avail themselves of its use to the fullest possible extent but they should keep a close watch on its movements, and from time to time, when this appears necessary or advisable, suggest changes in its policy or improvements in its methods. Such suggestions to have effect should, of course, follow the regular channels. All official communications between Canada and the Institute are made through the Minister of Agriculture at Ottawa, who will see that any proper representations made to him or through him to the Institute receive due consideration, whether these originate with individual farmers or with any organization of farmers.

Its usefulness can, by such means, be indefinitely extended until its beneficent influence is felt on every farm and in every farm house, as well as in every farmer's bank account.

In this connection, I would suggest to our friends of the agricultural press that in the Institute, and especially in its publications, there is a hitherto unworked mine of useful and up-to-date information, much of which is applicable to Canadian conditions and likely to be of great value to Canadian farmers.

Rome, the great city where the Institute has its being, was not built in a day. It is barely five years since the Institute was established.

It will, no doubt, grow with time but it may as well be realized that for the rate and manner of its growth, as well as for its practical value now and hereafter, the real responsibility must lie with the farmer in whose interest it was conceived and on whose behalf it is being maintained.

It may be that as time goes on and the advantages of co-operative action become more generally apparent to those engaged in agricultural pursuits, we may see in this, and in many other of the adhering countries, the birth and development of national institutes designed and equipped to work in helpful harmony with the Mother House at Rome. There is in fact no limit to the possibilities of agricultural progress in this, as in many other directions, but there is a limit to my time and another to your patience, and I, therefore, conclude by expressing the hope that some at least of those present will from now on take a larger interest than they have hitherto done in the International Institute of Agriculture. (Applause.)

CHAIRMAN.—I do not know that this is perhaps a paper for discussion and the time has been taken up entirely. That you will agree with me it has been well taken up, I am sure. Every delegate here will look forward to getting a copy of the annual report of the proceedings of this association in order that in that report they may have a copy of the address they have just listened to.

I will now call upon Dr. C. W. Dickson, of Kelowna, who will speak on the culture of tobacco.

TOBACCO CULTURE UNDER IRRIGATION CONDITIONS IN THE OKANAGAN VALLEY.

Dr. C. W. DICKSON.—That the tobacco industry is fast assuming the importance of a national Canadian enterprise is, I regret to say, a fact appreciated by but a small proportion of the citizens of this country.

For many years, when Canadian tobacco was spoken of, one's thoughts immediately reverted to the crudely cured French-Canadian twist, one pipeful of which was liable to leave a life-long impression. To-day, Quebec tobacco, grown and cured under the direction of experts, is of a quality undreamed of a few years ago.

How many of you in this hall realize that the two Ontario counties of Essex and Kent annually produce in the neighbourhood of 15,000,000 pounds of tobacco, which finds a ready market, and is converted into many popular brands of cigars, pipe tobacco and chewing tobacco?

It is, however, more particularly of the industry in British Columbia that I wish to speak briefly this afternoon, and perhaps correct some erroneous impressions you may have on the subject, and also to give you some idea of the importance the industry is assuming.

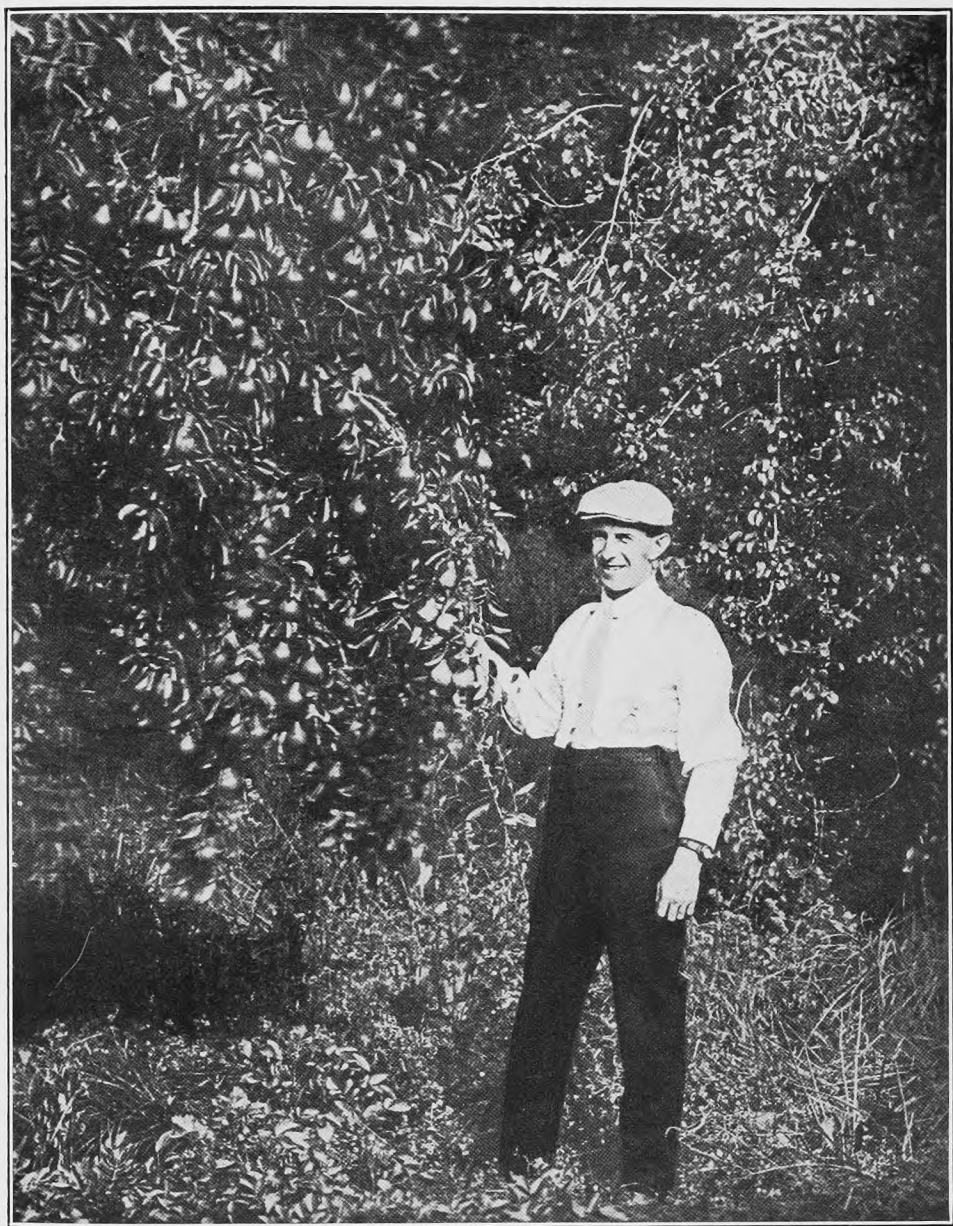
To the mind of the average individual—even the regular smoker—tobacco is nearly always associated with Cuba, Virginia and Turkey. Egypt, a name associated with many well-known brands of cigarettes, is not a tobacco-producing country; the tobacco comes from Turkey and is manufactured into cigarettes in Egypt. Many will, perhaps, have a vague idea that the states of Kentucky, Connecticut, Ohio and Wisconsin can produce excellent tobacco of various kinds, but when you begin to talk of growing the weed in Canada, and especially British Columbia, the question nearly always comes with a note of surprise—‘Why, can they grow tobacco out there?’

In reply to such a query, it can be safely said, without exaggeration or fear of contradiction, that in the Okanagan Valley of British Columbia cigar tobacco, second only in quality to imported Havana and Sumatra leaf, can be and is being produced in important commercial quantities; and the industry is, relatively speaking, only now coming to be recognized as a factor among Canadian enterprises.

EARLY HISTORY.

Tobacco growing in the Okanagan began some fifteen years or more ago, when Mr. Lewis Holman came to Kelowna from the tobacco fields of Wisconsin. Recognizing the suitability of soil and climate of this fertile valley, Mr. Holman began a number of experiments in growing various kinds of leaf, and soon discovered that his first impressions were justified and that tobacco of a decidedly superior quality could be successfully grown.

Many difficulties handicapped the early growers, chief among these being lack of sufficient capital to conduct the business along the most desirable lines. Another factor which held the industry back was the unfavourable customs and excise regulations, which gave no encouragement whatever to the home-grown product. This has



Dr. C. W. Dickson, Executive Committee, Kelowna, B. C.

been overcome within the last five or six years by the imposition of a duty of 28 cents per pound on all new leaf brought into Canada, and the various encouragements offered to growers by the Dominion Government. A permanent Tobacco Branch has been established under the Department of Agriculture in Ottawa, in charge of experts, whose services are at the disposal of growers all over the Dominion. In Ontario and Quebec tobacco experimental farms have been established, and experiments are being carried on to determine the best varieties to grow in various sections, the best methods of growing, cultivating and curing, and, in fact, to try and solve the many problems that confront successful growers.

British Columbia up to the present has not been granted one of these experiment stations, but we have hopes, as the advantages to be gained are too obvious to enlarge upon.

A local company was formed several years ago in Kelowna, which carried on the business of growing the tobacco and manufacturing it into cigars. The area planted was restricted to some 50 or 75 acres, and the business was somewhat limited as a consequence. In 1912, this company was taken over by the British North American Tobacco Company, Limited, with a capitalization of \$500,000 (which has since been increased to \$1,000,000), and since then an era of activity and enterprise has been inaugurated, which has placed the tobacco industry of Kelowna, B.C., among the big commercial projects of Canada, and incidentally made the British North American Tobacco Company well and favourably known throughout the West. This year about 300 acres are under crop and next year the area will be larger. Mr. A. W. Bowser, the president and general manager of the company, is a Canadian, and has gained his experience in the tobacco business in the United States, West Indies and South Africa, and brings with him a business ability and technical knowledge which go far to ensure success.

TOBACCO LANDS.

At the present time, Kelowna is the centre of the tobacco-growing industry in British Columbia. Experiments in growing the leaf in other sections are being carried on, and it is safe to predict that within a few years many other places, distributed over a large area, will be found to have a suitable soil and climate. Possibilities are great, returns are excellent, and expansion is bound to follow.

The soil giving the best results in Kelowna at present is a rich sandy loam, verging to a clay loam. The heavier soils are not as suitable to grades of leaf grown, but can be utilized for coarser grades of tobacco used for pipe and chewing purposes. The lower or bottom lands are at present almost exclusively used, but the possibility of successfully growing on the sandier bench lands is one that should be borne in mind as worthy of experiment.

VARIETIES OF TOBACCO.

Leaf for cigar purposes constitutes the principal crop. The varieties are: Cuban or Havana, Comstock Spanish, Wisconsin seed leaf and Sumatra.

The Havana leaf is used principally for filler, that is, for the main body of the cigar. A certain proportion, however, of this leaf is of an exceedingly fine quality and is suitable for wrappers.

The Comstock Spanish and Wisconsin leaf is a much larger, silkier leaf and is used for the cigar binder.

The Sumatra leaf is the finest and most expensive leaf grown and is used exclusively as a wrapper. This tobacco is grown under shade and will be discussed more fully later.

Other varieties are being grown in an experimental way and results so far are very encouraging. These are: Bright Virginia, for pipe and cigarette purposes; White Burley, for pipe and chewing; and Boer tobacco, for pipe smoking.



Tobacco leaf as grown under cheese cloth in Cuba.

It is the intention of the British North American Tobacco Company, at a later date, to install a plant for the manufacture of pipe tobacco and cigarettes, and these experiments are for the purpose of selecting the most suitable varieties for a pleasing blend.

YIELD PER ACRE AND PROFITS.

A good average crop of Havana tobacco will be about 1,000 pounds per acre, worth about 25 cents a pound to the grower. Wisconsin and Comstock Spanish are heavier yielders, giving 1,400 to 1,800 pounds per acre and worth 15 to 20 cents or more per pound. Profits range on an average from \$125 to \$175 per acre, and are sufficiently attractive to be worth considering seriously.

SEED BEDS AND PLANTS.

The tobacco plants are raised from seed and must be started in seed beds. In Ontario and Quebec hot-beds with glass tops are often necessary for the purpose, but

in the Okanagan a cold frame covered with cheese cloth or cotton is quite satisfactory. The land should be fine, light and loamy, and worked up very carefully, and the beds given a southern exposure. Inch lumber is used for the frames and a convenient size is 3 feet by 12 feet or 3 feet by 24 feet. A bed of the latter size will supply sufficient plants for an acre of ground.

Tobacco seed is very minute. Some idea of its size can be gathered from the fact that a tablespoonful will give plants enough for an acre. The seed should be carefully selected and only that obtained from a reliable source used. All light material and light seed should be eliminated and only full, plump, heavy seed used for planting. As germination is comparatively slow, the common practice is to hasten the growth of the seedlings by germinating for five to seven days in small woollen bags, kept moist and at a temperature of about 65° F. The seed bed is carefully worked up and the surface rolled or pressed down firmly and evenly. The seed is sown about the 1st of April, or even earlier if weather conditions permit. As the seed is so small it is best to mix it thoroughly with a large quantity of inert material, such as leaf mould or wood punk, or fine, dry sand. This mixture is then spread broadcast, as evenly as possible over the prepared bed, but not too thickly, as it is not advisable to crowd the plants too closely. The surface of the bed is then very lightly raked, again pressed or rolled, and the beds watered. The beds now require continual attention. They must be watered regularly, sometimes twice a day if evaporation is rapid. They must be kept continually moist, but not soaked or flooded. During the day the cheese cloth cover is kept on, except for a short time to ventilate and water. This cover retards evaporation and keeps the temperature up. At night, the outer cotton or burlap cover is put on to keep the beds as warm as possible, as the nights are apt to be chilly. In spite of the germinated seed, growth is very slow at first and the plants will not be much over an inch high after the first month. Once well started, however, growth is rapid, and at the end of the second month the plants should be about four to six inches high and in right condition for transplanting, which takes place towards the end of May or the first of June.

PREPARING THE FIELD AND IRRIGATING.

Work in the tobacco field should be started as early as possible. If ploughed the fall before, so much the better. The field is ploughed, disced and harrowed till the surface presents the finest kind of a mulch; it is then rolled. Next comes the irrigation. While irrigation plays an important part in tobacco growing and is quite essential in the Okanagan, except during a very rainy spring, it is of the simplest kind and should present few difficulties, even to a novice. One irrigation is all that is necessary or advisable and this irrigation is done at a season when water is most plentiful and one seldom gets into heated arguments with a neighbour on the subject. The prepared field is ploughed and cross ploughed into squares of about ten or twelve feet. Water is run into the furrows, and from these the squares are successively flooded, the water being allowed to stand in each square a sufficient time to thoroughly soak it and is then run off to the next square. The work of irrigating the field should be completed a few days before planting begins; sufficient time in fact only to allow the field to be disced, cross disced, harrowed and rolled. We now have suffi-

cient moisture stored in the soil to last the tobacco plant during its growing season—that is if we follow the golden principle of cultivating constantly and thoroughly. And I might mention, in passing, that this same cultivation may mean the success or failure of the whole crop.

PLANTING.

Planting should commence about the third week of May and be completed if possible by the middle of June. Frequently crops set out well into July have been successfully harvested, but it is preferable to be on the safe side.

Transplanting may be done either by hand or with the Bemis transplanter; the latter method being exclusively used in the Okanagan. The transplanting machine is drawn by two horses, and two men with their trays of plants sit at the back on seats that just clear the ground. The machine makes a shallow furrow, the plant is dropped through a slot and immediately the earth closes in, passing firmly and evenly into the ground. The two men drop alternately and the result is an even row of well set up plants, far superior to hand planting. The spacing of the plants is regulated by cog gears; at every revolution a click indicates the proper moment to drop a plant; as the plant drops, a valve opens, and the root of the plant is watered from a barrel carried on the body of the machine. If desired, another attachment can be used, which will also add fertilizer at the same time. A marker is used to indicate the next row and give uniformity of alignment.

Havana tobacco plants are usually set out eighteen to twenty inches apart and three feet between the rows. Comstock Spanish, Wisconsin and other large varieties will be set out thirty to thirty-six inches apart with three to three and a half feet between rows.

THE GROWING CROP.

As soon as the plant is well established, which under favourable conditions takes only a couple of days, cultivation is begun and continued until it is rendered impossible by the rapid growth of the plant. Hand hoeing is sometimes necessary, but special cultivators do away as much as possible with this expensive treatment. Havana plants soon send out shoots or suckers and these are snipped off as soon as possible in order to force all the growth into the leaves of the main stalk. These plants will have to be suckered three or four times during the season. Wisconsin and Comstock Spanish are not so prolific in secondary growth, and need less attention.

As soon as the flower head is sufficiently developed, the plant is 'topped.' A number of leaves at the top of the plant are taken off with the flower head in order to allow the remaining leaves to grow more rapidly and to have as many leaves as possible reach maturity about the same time.

PESTS.

Fortunately we have very few pests to contend with. The cutworm may give some trouble soon after the plant is set out. It is, however, very easily dealt with by spreading broadcast a slightly moist mixture of bran, Paris green and molasses.

What is called the 'wire worm' is sometimes met with in small numbers. It bores up through the root to the stem of the plant, killing it off in the early stages of growth.

PLANT AND SEED SELECTION.

To secure the best results, both as to yield and quality, most careful attention must be paid to the question of plant and seed selection. Starting with imported seed, this should be of the best selected quality it is possible to obtain. After cleaning the seed as well as possible, the next selection will take place in the plants taken from the seed bed. When the plants are well started in the field, a careful selection is made of plants to be grown for seed purposes. The flower-head is left on these, and before the buds burst the top leaves are stripped off and the flower-head covered with a large paper bag loosely tied around the stem. This prevents cross-fertilization with other varieties of tobacco or with less desirable types of the same variety. In this way it is possible to perpetuate what has been selected as the best type of plant and leaf for that particular variety. When the seed is fully formed the bags are removed and the seed allowed to ripen, when it is saved for future use.

It may take several years before a type more or less approaching an ideal is secured, but the improvement in the quality of tobacco will justify any amount of trouble in this respect. Already this principle has been adopted in the Okanagan, and excellent as is the tobacco grown at present, every year will see an improvement which will eventually place British Columbia tobacco on a par with the best of the foreign grown leaf.

HARVESTING THE CROP.

The Havana leaf will ripen first, taking about sixty days to mature after being set out in the field. Wisconsin and Comstock Spanish take a little longer, about seventy to seventy-five days. Yellowish spots or blotches begin to show through the bright green of the leaf and it is about time to begin cutting.

The harvester uses a broad bladed hatchet and cuts the stalk just above the ground and lays the plant down carefully to avoid injuring the brittle leaves. After wilting in the sun for a short time, it is piled up ready for the 'spearer.' This man has a lath, fitted in a tripod, and over one end of the lath he fits a spear. The butt end of the stalk is split on the sharp point and run on to the lath. Enough plants are put on the lath to fill it comfortably, but without crowding. The filled laths are placed on a rack and taken to the barn, where they are placed on scantlings set the proper distance apart. The sides of the barn are provided with hinged boards which can be opened or closed, and the drying process regulated to a nicety. A barn about 23 feet by 120 feet, when filled from roof to floor, will take care of an average crop from ten acres. Such a barn will cost about \$1,000 to build.

SHADE-GROWN SUMATRA.

The fine-textured, silky, oval Sumatra leaf, with its delicate veinings, makes the ideal cigar wrapper. It is also the most expensive tobacco on the market and brings from \$2.50 to \$4 per pound or more according to quality. To grow a leaf equal to the Island product was the ambition of tobacco growers for many years. The experiments were long and costly, but to-day Connecticut, Porto Rico and a few other

tobacco countries are successfully producing a Sumatra leaf, grown under shade, which meets all the requirements of an exacting market.

Can the Okanagan do likewise? Most emphatically—yes. Last year an experimental plot of about half an acre was planted. Results were so satisfactory that this year over twenty acres have been put under shade, and next year it is proposed to plant a much larger area.

The shade tent is composed of a specially woven cheese-cloth about twelve feet wide, stretched over wires supported on poles nine feet high. The temperature under the tent is always several degrees higher than that outside and the growth of the plant is unusually rapid and luxuriant. Cultivation, suckering and topping are very similar to other varieties, but the harvest is different. Instead of cutting down the whole plant, the leaves are 'primed' as they ripen; that is, each leaf is picked separately as it matures, strung on stout twine, hung up and allowed to dry. It can be seen that this is an expensive proposition. Aside from the cost of the land, it means an expenditure of over \$500 per acre to erect the shade tent, and the cloth is only good for two seasons. But for the successful grower the returns are handsome. The net profit should be in the neighbourhood of \$800 or \$1,000 per acre. The growing and curing of the Kelowna Sumatra crop is in charge of an expert from Sumatra, and present indications are quite satisfactory.

DRYING AND SUBSEQUENT TREATMENT.

Curing the tobacco in the barns requires skill and judgment, as does every other step in the process. Drying must not be too rapid at first, or a serious deterioration of the leaf takes place. Later, the process may be hastened by judicious use of the hinged sides of the barn, which act as ventilators.

As the drying goes on, the leaf assumes a tinge varying from yellow to golden brown or brown. The length of time it takes for the leaf to dry well to the mid-rib varies according to the temperature and weather conditions. It may be ready to leave the barn in six weeks or two months. It may have to remain in the barn all winter.

When ready, the laths are taken down and the tobacco stripped leaf by leaf from the stalk, graded according to size, tied up into bands and made into bundles of twenty or thirty pounds. These are sent to the factory, where the leaf is put through the process of fermentation, more commonly called 'sweating.' Here again, knowledge and judgment enter into the treatment, and if we have managed skilfully all our various operations, the leaf will in another couple of months, or nearly a year and a half after our seed was planted, be ready to convert into a first-class cigar, which you need have no hesitation in presenting to your best friend. (Applause.)

CHAIRMAN.—Dr Dickson's paper is now open for discussion.

MR. DUFRESNE.—I have listened with a great deal of interest to this paper of Dr. Dickson's, and I think I may say it is one of the clearest and most lucid papers I have ever listened to in my life. There were three points that I would like to be enlightened on, if the doctor would let us have the figures. I would like to know, if possible, how much water per acre is necessary; what season of the year must be free from frost for successful culture, and if the doctor could give us any data as to the limit of altitude.

Dr. DICKSON.—With reference to the amount of water, I am sorry to say I cannot give any accurate data. We usually consider that as the tobacco irrigating is only done once and that takes place at a time of year—usually the middle of May—when water is most plentiful, we never have any difficulty in getting sufficient water to give the land all it requires for the tobacco crop. In that respect I may say I thoroughly agree with all the principles of dry farming that can be brought forward on the conservation of moisture once in the soil. A rough estimate of one to two inches of water would be amply sufficient. I am not referring to the miner's inch but the newer measurement adopted by the British Columbia Government.

Your second question asked what season of the year must be free from frost. I would advise, if possible, getting the plants in towards the last week in May, though sometimes even as late as the middle of July plants set out have been successfully cultivated; but personally I would not like to run such a risk unless it was absolutely necessary. Usually, in the Okanagan, there are no frosts till the middle of September or probably the first of October, and a degree or two of frost will not injure the growth, so that except in exceptional seasons there is little danger in harvesting the crop. We have some light night frosts in May in the Okanagan, though this is not the rule, and if your crop is put in the third week in May or the first two weeks in June there should be no danger in harvesting successfully.

Referring to the question of altitude, I cannot speak with very great authority. The main growing points of the tobacco industry in the neighbourhood of Kelowna are the plantations of the British North American Tobacco Company, and at Kelowna these have an altitude of 1,100 or 1,120 feet, and I suppose where I grew tobacco several years ago it would be say 150 or 200 feet higher than that. That is still in what is called the bottom land. I called attention in my paper to the possibility of growing tobacco on the bench lands which, as a rule, are much sandier than the lower lands. Whether they would be able to retain moisture sufficiently is a point to be experienced. It is very possible that these high bench lands will grow some of the finer grades of leaf, the sandy soil being more suitable for Havana or Sumatra. They may be more suitable, and if the moisture can be conserved sufficiently in these higher lands, I see no reason why tobacco could not be successfully grown at a considerable altitude above the lake, five or six hundred feet. In fact, the seasons up there in several points are perhaps even a little longer than in the lower part. Spring is several days ahead and perhaps the frosts are a week or two later in the autumn.

A DELEGATE.—I think if an actual test was taken as to the amount of water required, it would require much more than two inches. I think it would more likely be six.

A DELEGATE.—I would like to ask as to the rainfall.

Dr. DICKSON.—Kelowna is supposed to be in the dry belt, and in fact the rainfall in all that part is less than twenty inches. I think it is probably between twelve and fifteen inches.

Mr. PEARCE.—I would like to ask if you can continue growing tobacco year after year on the same soil. Should it be fallowed? The reason I ask the question is because I have been advised that Sumatra tobacco is only grown once in seven years

on the same soil and during the six other years the soil is kept fallowed. I also understand that even in Sumatra only a small part of the country will produce the highest grade of leaf. In Java, during the intervening years after the first crop of tobacco, they raise one of rice and one of sugar. The land is under three crops.

Dr. DICKSON.—In tobacco culture, I imagine as in any other crop, the modern up-to-date farmer will practice rotation. I could, however, refer to some tobacco lands in the Kelowna district where the lands have been cropped for the last thirteen or fourteen years continuously in tobacco. I don't think it is a good practice myself. The tobacco grower will obtain far better results either by rotation of crops or by being careful to add fertilization to make up whatever the tobacco plant may take from the soil. Tobacco, as you know, has an especial attraction for the potash in the soil, which perhaps is one of the things soonest exhausted, so that while the soil may continue to grow tobacco year after year, it would be very bad farming practice, I should imagine, to grow it continuously and especially without adding the proper kind of fertilizer. I am not in a position to refer to Mr. Pearce's statement that tobacco is grown only once in seven years in Sumatra. I have never taken up that matter in detail.

Mr. PEARCE.—I only alluded to the portions in which the wrapper is grown, and it might be interesting to note that that is wholly administered by the government; private enterprise does not enter into it.

Dr. DICKSON.—It is an interesting fact that the Agricultural Department in Connecticut raised the question of growing Sumatra under shade. A tobacco experimental farm was established, and for a good many years they carried on a series of very expensive experiments trying to grow Sumatra leaf successfully under shade. They succeeded at last, and to-day Sumatra tobacco is grown in Connecticut under shade and commands a very high price in the trade. \$2.50 to \$4 a pound for Connecticut grown Sumatra for cigars is a common price. In Porto Rico also Sumatra is grown very extensively under shade tents. Sometimes single fields of one to two hundred acres are covered entirely by these shade tents, and I have no doubt that a lot of the tobacco sold to the trade as imported Sumatra may come from one or the other of these sources.

CHAIRMAN.—We have with us Mr. James White, Assistant to the Chairman of the Commission of Conservation, Ottawa, who is to address us.

CONSERVATION AND IRRIGATION.

By MR. JAMES WHITE.

MR. CHAIRMAN, LADIES AND GENTLEMEN.—I am sure with the temperature at its present altitude you will be glad to hear that my remarks are to be very brief indeed. I propose to take up very briefly a little of the recent work of the Commission of Conservation, which directly or indirectly affects the interests you have at heart. First of all, with regard to the important question of the conservation of our forest resources, we recently appointed an officer to fill the dual position of forester to the

Commission of Conservation and chief fire inspector to the Railway Commission. Prior to our decision to appoint the gentleman who now holds that dual position, we engaged an expert forester from Boston to prepare the necessary regulations. After they were prepared, they were submitted to Judge Mabey, then chairman of the Commission, and with some minor amendments, particularly with reference to the legal phraseology, they were adopted by him. Later, before the Railway Commission, where all the railways of Canada were represented, these were duly approved and went into effect a year ago last May. Last year was a very wet season and there was no undue strain placed upon the organization. That, however, has not been the case this year, which is an average season. It is very gratifying to every one connected with this movement to see that the railway companies now recognize the enormous value of the regulations, in their own interests as well as in the interests of the people. When I passed through Winnipeg last Sunday, I met our forester, and he told me that the railway companies were doing more than was ordered. That I think is the best possible proof of the changed attitude of the companies. The railways, I may say, are maintaining a large staff to carry out these regulations, and in the west the officials of the Forestry Branch have also been made officials of the Railway Commission for the purpose of the administration of this Act.

We have also approached the provincial governments and, with practically no exception, they have either already commenced, or agreed to commence, the promulgation and carrying out of the same regulations. In that connection, I may explain that the Commission has jurisdiction over all railways chartered by the Dominion Government, the jurisdiction with reference to other lines resting with the provincial governments. It is also interesting to note that the Canadian Pacific Railway has installed oil-burning engines on their line between Vancouver and North Bend and on other mountain lines, leaving only a portion with coal-burning engines, where there are practically no forests which could be injured.

Now, before concluding that, I would like to say a few words about the exaggerated estimates of our forest resources. I bring this point up to emphasize the enormous value of the forests, but particularly of the preventative measures that must be taken. At a meeting of the Forestry Convention in Winnipeg four weeks ago, one of the principal speakers said that Canada had an unbroken belt of forest extending four hundred miles from the Atlantic to the Pacific and from four to five hundred miles wide, and that our forest resources greatly exceeded those of the United States. I cannot conceive of a more misleading statement. Instead of having greater, or even as great, we have not more than one-fourth of the forest resources of the United States. The United States to-day has about four times the forest resources of Canada. Another effect of these erroneous statements is the fact that in the United States, when the conservationists there advocate forest conservation, they are met with the remark:

‘Oh, when our resources are finished, we will go to Canada.’

Now, as a matter of fact, if we had to supply, to-day, the present consumption of the United States, our resources would not last fifteen years—actually not that long.

With reference to our agricultural work, we have throughout the various provinces of Canada commenced thirty-seven illustration farms and this year we will

have forty in operation. I should explain that these are not 'experimental' farms in any sense of the word. In any locality selected we get the best farmers in the vicinity to hold a meeting and agree to select from among their number the farmer who, in their opinion, has the best farm and who is likely to carry out our advice and achieve the best results. The choice of this farm is entirely non-political. No politics enter into the matter in any shape or form whatever, and I may say that the farmer whose farm is selected as an illustration farm does not receive any wages or salary whatsoever. He receives no remuneration—no return, except such as may come to him from doing what he can to advance farming in his district; and the actual cost to the Commission of Conservation for these farms only averages \$150 to \$300 per annum. That is wholly for any extra work we may ask him to do, for any extra seed and the extra price required to buy the very best seed. Wherever there are illustration farms we organize what are called Local Improvement Associations, that these farmers may meet and discuss their experiences, their difficulties, and may examine the illustration farms; and, at intervals, our experts meet them and give them the benefit of their experience. The results we have achieved in this way, at a very small expenditure of money, have been very gratifying indeed.

With reference to the question of weeds in the prairie provinces, I will read an extract from one of our reports:—

'The prevalence of weeds and the cost of controlling them is the most serious problem facing the majority of these men to-day. Wild oats are the worst. On many farms they leave little if any profit for the farmer. Thirty bushels dockage on a hundred-bushel load is an extreme case, but it will illustrate the point. Stinkweed is most prevalent, but is not the menace the wild oat is. Most of the other common weeds may be found but in much smaller numbers. Canada thistle has gained a foothold, and will be suppressed only by an intelligent, patient and persevering community effort. The weed problem is here in all its intensity to-day; and the fact that people realize its cost to the community may lead—nay, is leading—them to plan for the introduction of a changed system. A few men are branching out into more diversified farming. The majority of the farmers in the prairie provinces treat their seed grain for smut, with the result that there is very little loss from this source.'

That, to my mind, is one of the most important questions the farmers have to face to-day, and in discussing it we are open to suggestions. We have some laws, but the trouble is they cannot be effectually enforced, and the fact that this question is up for special discussion is an acknowledgment of this very fact. No one need expect the average man to complain against his neighbour; he will not do it; and as for the weed inspectors, it is notorious that many offenders are not prosecuted as they should be. It seems to me that, in addition to the enforcement of the weed laws the only way to deal effectually with this problem is by an educational campaign carried on by such organizations as these Local Improvement Associations of ours.

A word with reference to our illustration farms. We consider that they are doing a great work for the improvement of agriculture, and trust that similar farms may be established and carried on by the Dominion or various provincial governments. It seems to me that this might also assist in solving the weed problem, and

it undoubtedly offers a maximum of results for the minimum of expenditure. These illustration farms can be established in many localities and for one-twentieth of the cost of the ordinary experimental farm.

One more word with reference to waters and water powers. We have been investigating the streams of the prairie provinces and of British Columbia, and hope next winter to publish a report which will be entitled, 'A Report on the Water Powers of Western Canada.' It will not be, strictly speaking, an irrigation report, but all such information as we are gathering with respect to the flow of streams will be undoubtedly of great use in connection with irrigation projects.

In conclusion, I wish to say that the Commission of Conservation recognizes the great and important work that the Western Canada Irrigation Association is doing, as is proven by the fact that I am here to-day. I have come two-thirds of the way across the continent—and I am going back to-morrow—simply to wish you God-speed on behalf of the Commission and tell you how much we appreciate the work that you are doing. (Applause.)

Dr. DICKSON.—I would like to ask Mr. White if any means have been taken during the year with regard to dealing with the weed problem, aside from the organizations he speaks of. From my experience, I know that things are a great deal worse than they were three or four years ago, and I would like to know if anything has been done through the provincial governments to try to improve the Noxious Weeds Act and to prevent their spread.

Mr. WHITE.—In replying to the question of Dr. Dickson, I shall first say that the Commission of Conservation is not an administrative body. Its functions are wholly advisory and investigatory. We do not do any administrative work. The organization that does administrative work becomes responsible for administrative work. We occupy the position of critic—friendly wherever possible—and wholly and solely advise. We do not and cannot take any administrative work in connection with the weed problem. In establishing our illustration farms, we have done what you might call quasi-administrative work, but only to show what can be done. They are undertaken only for a period of three years. This is the second year and then we will either turn them over or abandon them, whatever you like to call it, to the Dominion or provincial governments. It is not our purpose to carry them on in perpetuity because that would inevitably lead to administrative work. One of the basic principles laid down by Mr. Sifton was that we were going to do the maximum of work for the minimum of money. (Applause.)

Mr. E. FOLEY-BENNETT.—I would like to ask if any reports of the illustration farms are to be published.

Mr. WHITE.—They are published in our annual reports. The report of last year, the fourth annual, will be ready for distribution in the course of three or four weeks.

Mr. C. E. LAWRENCE.—Friends from British Columbia have prompted me to ask Mr. White whether he can make any definite announcement of demonstration farms for British Columbia. We have none there, apart from the one at Agassiz, which is in the wet belt and has been turned over to the Live Stock Branch. We would rejoice to know that these illustration farms are about to be located in what we call the dry belt of the interior.

Mr. WHITE.—I am not in a position to answer Mr. Lawrence's question as to the situation and distribution of the illustration farms in British Columbia, as that matter is entirely in the hands of our Committee on Agriculture. We have seven committees which cover the six grand divisions of our varied resources, of which agriculture is of course one. The location and establishment of these farms are entirely in the hands of that committee, and I am not prepared to say exactly where they propose to select them. Owing to the lack of extensive areas where mixed farming has been carried on, the establishment of the British Columbia farms has been deferred until this summer.

Mr. E. FOLEY-BENNETT.—In answer to that question, I might state that the authorities in the Okanagan have been notified that the government has set aside 160 acres of land in the dry belt for an experimental farm.

Mr. WALTER HUCKVALE.—Mr. President, ladies and gentlemen, I have been rather interested to hear what Mr. White had to say about the eradication of weeds and the duties of the provincial governments in carrying out the laws and regulations concerning noxious weeds. It seems to me that it is a very difficult matter for any department to carry out rules and regulations concerning noxious weeds, and it is only a matter of time when the farmers themselves, whether through individuals or local associations, will see the necessity of subduing the weed pest themselves, and as both Dr. Rutherford and yourself, Mr. President, have mentioned earlier in the day, that farming is indissolubly connected with the live stock industry, I think that really is the only solution of the weed question. I think that sheep are the final salvation of this western country of ours. I was not present when Mr. White commenced his address and did not hear all he said. Of course, he was speaking of conservation, and conservation is a very important question no doubt, but there is another question very intimately connected and that is tree culture, and I think that this audience would be pleased to hear from Mr. White what the governments are doing in the way of tree culture. As far as I am personally concerned, that is a very interesting topic to me.

Mr. WHITE.—First with reference to the weed question. I am afraid I did not make myself very clear. I intended to convey the idea that I did not think that the highest degree of effectiveness could be attained by laws, provincial or Dominion. It has been tried and failed. There are a number of weed laws on the statute books and the fact that they have failed seems to me to be proof positive that it cannot be done that way. My contention is that it can only be done by supplementing the enforcement of the weed laws by the education of the farmer through such agencies as our illustration farms.

Referring to tree culture: the Forestry Branch of the Department of the Interior has done a great deal, but it is not to be expected that they are going to supply trees to anyone and everyone, and inasmuch as I am not conversant with this phase of the subject, I would suggest that Mr. Drake, who is a member of the Forestry Branch, can give you any information you desire on that point.

Mr. DRAKE.—I am sorry to say Mr. White is mistaken. I am not a member of the staff of the Forestry Branch, although I used to be some years ago. There will,

however, be two papers, I understand, on the programme later on, dealing with this phase of the question.

MR. HUCKVALE.—Mr. President, Mr. White simply agreed with my solution of the question and referred the second part of what I had to say to Mr. Drake, who rather denies any knowledge of the subject. Now if there is any official of the Dominion Government here who is acquainted with the question of tree culture—not from an individual but from a public ownership point of view—I think it would be very interesting to hear from him in this particular connection. I noticed on the programme that Mr. Campbell was to speak, but I have not seen him here. Perhaps Mr. Miller later on may give us some very interesting information on that particular point. It would be particularly apropos, I think, of the Western Canada Irrigation Association if we were told some definite statistics on the question of tree culture.

A DELEGATE.—I would like to speak a word on the subject of weed eradication. Some have said that the provincial governments could not handle the matter successfully. What are we going to do until the people are educated? It seems to me some of the outlying districts will be in very bad shape if we are to wait until the process of education is complete.

HON. DUNCAN MARSHALL.—If the Doctor will occupy this chair for one minute, I might intrude a few remarks on the weed question. (Applause.) I have a somewhat intimate knowledge of the subject, and have in the last few weeks travelled over one thousand miles in an automobile with my chief weed inspector, and while Mr. White says that the administration of the weed laws has been a failure, I think there are some people who have had to spend a good many hundred dollars in destroying weeds, through the enforcement of the Weed Act this year, who would scarcely agree with him. We have coped with the question with a measure of success, and it might be fitting at this convention for me to thank the Western Canada Irrigation Association for their co-operation with the Department of Agriculture. Particularly is this true of the Canadian Pacific Railway. The Department of Natural Resources of the Canadian Pacific Railway has spent a great many thousand dollars and gone to great efforts in fighting the weed evils of this province. I think it can be said their ditches east of Calgary are comparatively free of weeds at the present time.

Now the educational system is all right and must be the ultimate method of destroying the weeds, but something must be done in the meantime, and while we are doing a good deal of educational work we are also doing a very considerable amount of police work as well and the result of both, I think, has been very satisfactory. We have spent in this province this year some \$30,000 in the extermination of weeds and we have got good value for our money. I agree with Mr. Huckvale as to sheep playing a very important part in this question, and this year, wherever rural municipalities have taken the matter up seriously and co-operated with us, we have had very excellent results. We hope at the coming session of the legislature to amend the law in some respects by which we can get better support and more co-operation. We believe that we can conduct a campaign that will keep the weeds in check and wipe them out in some districts, and that together with education, that will mean better farming and more live stock farming, the weeds will eventually be kept down in this province. In the meantime, however, there is certainly need for a good deal of police

work, especially in connection with vacant land, but the money we have spent will eventually come back, because we charge it in taxation against the land; otherwise, a good many farms would be overrun through the absence or neglect of neighbouring owners. The co-operation of rural municipalities, as well as the work of organizations that are promoting better lines of agriculture, smaller areas in charge of good men, is having an effect, and we believe we have the weed problem in this province well in hand. (Applause.)

HON. DUNCAN MARSHALL (on resuming the chair).—I will ask Mr. Henry Holmes, who has been following dry-farming methods in this province, and won the prize for the best bushel of wheat at the Dry-Farming Congress, to speak to us.

MR. HOLMES.—Mr. President, ladies and gentlemen, this meeting is getting very interesting to me because I have been farming here now about thirteen years, battling with weeds and dry weather and it is a very uphill business, I tell you, at times. I am trying with the rest of the farmers to do the best I can and follow the latest methods of dry land farming and scientific farming. I have a very good patch of grain this year and expect to compete again if it turns out good, but of course, the weed problem is getting quite a serious thing in our district. Some have abandoned their land. They have got discouraged and given up their land and it will probably go into the hands of the loan companies. There are several near me, and I cannot do any farming so long as the weeds are left there. There is mustard standing that high (indicating). The weed inspectors did not get started till July. That is not early enough in the year. I know farmers who ploughed the mustard under as summer fallow when it was ripe and consequently have no wheat. I am very much interested in this, but I am sorry to say I am no public speaker. (A voice—You are giving us good stuff.) I am getting kind of discouraged myself with the methods around me. I want to farm right and when I do a thing in that line I don't like to leave it half done, but this spring when I was sowing Marquis wheat I found mustard that had come all across the fields. There is mustard all through land of mine that was absolutely clean. It will cost me a good deal more to tie up with extra twine on account of careless neighbours. I went to one farmer whose land was overrun and said, 'You had better let me have that,' but he said he would see to it, and he never did a thing to it and let volunteer grain grow up and subsequently the mustard came up. I am very pleased to be here this morning as I am much interested in this kind of work. I thank you. (Applause.)

CHAIRMAN.—I might say just here that we have notified all our local weed inspectors for the province to give the department the names of men who have dirty fields of grain this year, and we intend to send them a notice during the winter asking them to summer fallow and clean up their fields next spring. If they disobey that, we will have no hesitation, and they will have no complaints, if we compel them to cut them down and burn them—even if it is a field of grain. (Hear, hear.) This is a big province and it is hard to get over it; still by schemes of that kind we hope to accomplish a solution of the matter as near as possible.

I wish now to call your attention to the particularly interesting programme which we have for this evening, and I will now declare this convention adjourned to meet this evening at eight o'clock sharp.

TUESDAY EVENING SESSION.

CHAIRMAN.—I regret to inform the delegates that Mr. William Hanley is not present this evening to read his paper. I also have here a telegram just handed to me from the Hon. W. R. Ross, Minister of Lands for British Columbia, which reads as follows:—

VICTORIA, B.C., August 5, 1913.

NORMAN S. RANKIN,
Lethbridge, Alta.

As previously intimated, engagements here have prevented me from attending Irrigation Convention this year, and I must therefore ask you to be good enough to express my regrets accordingly. From list of speakers it is apparent sessions will be of more than educational value, and the meeting point spells hospitality and enjoyment for delegates. Best wishes for a pleasant and profitable convention.

(Signed) W. R. ROSS.

I have been requested to ask the members of the Executive Committee of this association to meet here at the close of this meeting. I am very pleased now to be able to introduce to you Mr. H. C. McMullen, General Live Stock Agent of the Canadian Pacific Railway, Calgary, who is very well and favourably known, especially in our province of Alberta, and who has had a good deal to do with practically every phase of the live stock industry.

LIVE STOCK ON THE IRRIGATED FARM.

MR. H. C. McMULLEN.—Mr. President, ladies and gentlemen, I am quite sure I don't know to which to offer my congratulations: to the city for having secured such an important convention or to congratulate the delegates on having secured the privilege of meeting in so appropriate and beautiful a city as Lethbridge. (Applause.) There is no place I know of in the whole of Alberta where a discussion of irrigation problems would appear to be more appropriate than in the city of Lethbridge. I think perhaps the pioneer irrigation schemes belong to the southern part of this province. At any rate, those who have engaged in irrigation in this province have shown the best results in the southern portion, and I apprehend that the intention and the purpose of this convention was to discuss not alone the system of practice or science of irrigation in the light of new discovery, but to discuss ways and means of applying new methods to an old practice.

I take it that the value of any idea lies entirely and wholly in its application. That may sound a little bit hackneyed. Perhaps some of you have heard it before, but it is nevertheless worthy of very serious consideration, and I think that the man who carries that idea into his business is the man who will secure the best and most lasting and most profitable results from the application of that idea.

Some men seem to be obsessed with the idea that irrigation was discovered or invented or founded by somebody wholly and solely for the purpose of growing grain and fruit. There never was a greater mistake. Irrigation as applied scientifically, as it is done now, is an aid to agriculture that is applicable to any phase of it. My

remarks relate to the feasibility or practicability of the production of live stock in connection with the practice of irrigation. I don't know of any two systems or parts of agriculture that could be more logically connected. The science of irrigation, practically applied, would seem to me in the light of my experience, and the results attained by men thoroughly versed in this practice, to show that the greatest results in the line of fodder production have been produced on irrigated farms. That being granted, why should it not follow logically that live stock production would be a successful part of that farm, when it is demonstrated beyond doubt that fodder can be so successfully grown and so cheaply?

Now agriculture is an exact science, the laws of which are inexorable. The man who follows those laws, who pays attention to demonstrated facts, is the only man who can be a successful farmer. It does not matter what branch he follows. He must of necessity follow his business along lines of least resistance and those demonstrated to be the only successful ones. Few men in this country would have the temerity to dispute the assertion that irrigation as a science has been of incalculable value. Now then, how can we best and most favourably secure the results from the use of this water—from the practice of this science? I contend that the man who applies it to grain growing alone will make a financial failure, will become an agricultural bankrupt. I think that has been demonstrated in some of the older states to the south. We have not attained to an age that we can say with any degree of confidence that it is not feasible to practice grain growing alone under irrigation, but we have the light of experience shed on the question from the states to the south.

It would be idle for me to tell you gentlemen that irrigation is not new. The Egyptians, centuries ago, practised it. We old cow punchers riding out of Texas ahead of the sheriff used occasionally to run on the remains of prehistoric irrigation canals, so we have ample evidence that the practice is an old one. Now then, if the ancients with their crude methods of production and harvesting and marketing, and turning their production into cash, have made a success of it, it seems to me, with the benefit of the agricultural colleges and scientific methods as demonstrated by educated, experienced men, there should be no doubt whatever about the success of this practice. That being granted, how can we get the most money out of the land? That is what we are all after. If we are following the lines of greatest resistance, we are anxious for somebody to tell us about it and I contend that the men who are farming to-day, either with or without the aid of irrigation, who are not engaged in the live stock trade, are making a mistake. (Applause.)

There seems to be a well defined spirit of preaching among public speakers to-day and they will direct almost all their sermons at the farmer. The men who usually occupy leather covered chairs in comfortable offices, or who are behind the mahogany counters in banks, are very prone to tell the farmer what he should do, and I suppose perhaps I am as guilty as the rest. I have heard my friend to the right here preaching to the farmer and telling him what to do, and I have done the same thing at Sunday school picnics and that sort of thing (laughter), but the farmers are no doubt making a grand mistake.

Now, the question of soil fertility, soil exhaustion, is one of the most important that public speakers, in the interests of agricultural science, have to deal with to-day and I am forced to confess that there is no one feature of this agricultural prob-

lem that has given me so much personal concern as the exhaustion of the rich soil of these broad prairies.

Fertility is something that cannot be seen. If it could be, I am quite satisfied that not one in ten thousand would have the hardihood or apparent lack of intelligence—or, if you will, the lack of common horse sense—to destroy it and cart it off to the market and dispose of it as he is doing to-day in a great many cases. That is the trouble; fertility is hidden. The average business man engaged in milling or mining or a packing house concern will, the minute his raw material commences to get low—in his coal yards or in his bins—immediately take measures to replenish them. Now the fertility of the soil is the farmer's raw material. His cattle, his grain, his fruit, his vegetables, are the finished products. Now unconsciously this man has disposed of a large part of his capital and fooled himself into the idea it is his profit. I don't know that he altogether does that unconsciously. Sometimes I think it is a streak of selfishness. Such, perhaps, appears in all men—the pirates of the plains, as we are apt to call these grain robbers—it is selfishness pure and unadulterated. We are all selfish, but the other man, while he may be selfish, has sufficient of the good, red, sporting blood in his veins for him to take a chance. He is willing to put something back into the soil. There is no man so thoroughly deserving of the contempt of his neighbours and the ill will of his country as the man who lives by the wayside, from day to day, with a supreme indifference to the rights of posterity. None of us have the right to rob posterity.

Now it is an elementary truth that everything of value comes out of the soil, and if I were advising a young man to-day to choose a profession, to select for him some line of endeavour in which he was going to expand his talents and to which he would devote his life, I don't know in all honesty of intention that I could direct him to one so likely to prove remunerative as agriculture, properly followed: but, I would insist that that young man make it part of his investment, his daily and weekly and monthly endeavour to so balance the production of his farm that at least half of his output would be live stock. I don't think it necessary to repeat it to this audience, but in England they have farmed successfully for centuries. When some of you were running around here chasing cattle and buffalo twenty-five, thirty, forty years ago, the farms were old in England, and they are producing to-day more per acre than they did one hundred years ago. It is part of every land contract and lease extant in that country that the man who takes the land binds himself to replenish the fertility of that soil. He must agree to keep so many cattle and so many horses, sheep and swine on that farm, and he does not even dare to sell a load of manure from the back of the stable. That is why in England to-day they are raising larger crops proportionately than in Alberta or Saskatchewan.

A great deal of this land of ours is virgin yet, but it never saw the day it would raise the crops they are raising in England year after year, unless they should have an exceptionally unfavourable season. I contend we cannot afford as a nation, province, city or town, to take the chances we are taking to-day. The farmers of this country are intelligent. It is either thoughtlessness or selfishness or perhaps a mixture of both, but I am in hopes that the leaven that has been spread will leaven the whole. I am confident the results shown throughout the province, particularly where men are making large profits out of their live stock trade, are going to convince every man in this province of the advisability of engaging in it.

Now, it is hardly practicable for a man to say just how many cattle, horses, sheep or hogs should be carried on any given acreage. I think a man should be guided largely by local conditions. The man on the land is the man who knows best. He is the man who year after year has had to deal with the facts. He knows just what that land will sustain. We come then to the question of fodder for his stock. What is the most profitable? What will show the largest returns for the least exertion? Now here is a bunch of alfalfa standing on this stage which would do credit to California, and I have seen some grown there. (Applause.) The legumes are soil builders. They are all nitrogen feeders; so naturally it follows that if nitrogen is the body of your soil the plant that will gather and distribute and retain in your soil the most nitrogen, and that will build your stock the most economically, is the plant for you. I am prejudiced in favour of alfalfa, but there are other grasses that can be cultivated successfully and I learned the other day that you were growing corn fodder. We have a choice, but I will pin my faith to alfalfa. In the early days, down on the rich bottom of Bear River, below Evanston, there was a firm engaged in the live stock trade. They had been in sheep and supplied the logging camps but they found in supplying their custom with bacon they were at a large disadvantage. Now bacon in those days sold three pounds for a dollar and it was not very good at that. It all came from the East, there was a high freight rate and not much profit in it. Now Booth, one of the men, had great imagination and was clever at digging up new facts.

He said, 'I believe we can raise hogs here.'

'Yes,' said Thompson, 'you can raise hell.' (Laughter.)

There was one pig performing at a show there then. That was the only one.

'What can you feed them on?'

'I never thought of that. We can't raise corn. I believe we can raise alfalfa.'

Well, he did it. He cut a ditch in the river bottom and started raising hogs and praying for sunshine and the first thing he had big fields of alfalfa and broke the three pounds for a dollar combination all to pieces.

That was the beginning of the alfalfa irrigated farms in the West. All through Utah, through the western and southern parts of Wyoming and in portions of Idaho, they profited by Booth's experiment and put in a number of fields. That to my mind demonstrates that there is no doubt whatever about the value of alfalfa as a fodder plant. I see my old friend George Hatch there, and just want to call his attention to the transformation that has taken place in the Bitter Root Valley in Montana. George was there then in the early days, as I was, and we remember when there was nothing but bunch grass and an odd steer. To-day there are thousands of cattle and tens of thousands of sheep, all fed on alfalfa and making an enormous profit. Let us see the value of alfalfa. We will take beef at six cents a pound. Alfalfa will bring you \$20.16 a ton at present prices. Timothy will bring \$9.80. Alfalfa will yield three tons to the acre, that is \$60.48 you have got as a feeding value from the product of one acre of alfalfa. As against that, timothy will yield one and a half tons, worth \$14.70. In favour of the alfalfa you have \$45.78 over and above the profit you make on the timothy. Now one ton of alfalfa is equal to a ton of wheat bran and we all know wheat bran is a pretty strong fodder. It will produce more milk

from a dairy cow than the same weight in bran. It is more palatable and the cow would sooner have it, and a contented cow means more milk. It is a soil builder.

We will take the life of alfalfa. I presume there are men in this audience who have forgotten more about the details of alfalfa than I know, but I have taken pains to gather the facts, and I have indisputable evidence that the average life of an alfalfa field under proper conditions is seven years. I have known old fields that have not been ploughed up in forty years and are still producing. I think that is unusual but it is evidence that alfalfa is not a short lived crop. Those things, I think, in connection with the discussion on the value of live stock production on irrigated farms are worth consideration. No man should go into business without proper investigation, and those are facts so closely related to the business he expects to go into that they are worth investigating.

You can take the great feed farms of the Western States to-day. Wyoming in the early days was a bunch grass state. The man who had five tons of hay was a nabob; you would go ten miles to make the acquaintance of a man who had twenty tons. There was no hay. You would get a little along the bottom of the river, but feeding was never known. Now the State of Wyoming to-day is feeding from seventy-five to one hundred thousand sheep for the markets every winter. In half a dozen camps that I know of, that were bunch grass ranges, they are turning out twelve, thirteen and fourteen hundred pound steers, fattened on alfalfa and brome grass, and in places where they said a man was a fool to attempt it.

Now in these western provinces, I want to ask if there is any practical man in this audience who has ever seen land better adapted for the growth of alfalfa and the production of live stock than right in the provinces of Saskatchewan and Alberta? In British Columbia the area is more restricted. Now I suppose I have ridden every mile of Wyoming, Montana, Idaho, Utah and practically all of the cattle states and territories, and in none of them will you find the amount of cultivable area to the square mile that you will find in these two provinces. Is that not the line of least resistance? We are looking for a place where we can produce the greatest results in dollars and cents from agriculture and yet leave our due to posterity. I contend that under the system of irrigation as advocated by this association there is no other line of endeavour that would produce such results.

There is another point I wish to dwell on and that is the value of irrigation as a home builder. Just imagine going on to a farm, well fenced and hedged and with a few shade trees and perhaps a fruit tree or two, and an irrigation ditch across it at intervals, with a fairly comfortable house, nicely painted, and a good barn full of good horses and fat stock, and pens full of hogs.

Is not that the kind of a home that would inspire patriotism in a man? That is the kind of a home that makes a man want to fight for his flag. I don't think any of you would care to take up a musket and carry it to the front in defence of a boarding house. (Laughter.) That is about all they will ever get to unless a man is a successful farmer, or a banker, or perhaps a politician. (Laughter.) I am a great believer in the virtue of the home. I believe that it makes contented men and happy women and smiling children. A contented man is never looking for trouble, and I contend that there is no condition under which such a home as I have pictured can be built save on an irrigated farm, with the proper amount of live stock.

There is another feature in this connection, and that is the labour problem. Wherever exclusive grain growing is followed labour trouble is always present; not necessarily from a discontented labour element but from inability to secure sufficient labour to do the work of harvesting at the proper time; the inability to get men to plough your fields when they should be ploughed; the inability to get help to clear the weeds—and I will come to that again—there is no man carrying on the operations necessary on a diversified farm that ever has those labour troubles. If he is a bachelor, and he should not be, he can usually get the assistance of some neighbours, but most of the men who have the homes I am picturing are not bachelors. They have two or three good husky boys growing up, who dispose of the labour problem, which is a very serious one.

The officers of the railway companies and the officials of the Dominion and provincial governments are greatly worried every year as how best to distribute the necessary harvest labour. It is a case of where they are damned if they do and they are damned if they don't. If they send too many men to one section they are in trouble. If conditions change and they send them to another district there is trouble there. If they have too few south of the Red Deer and too many north of it, there is trouble; and these men are trying their best to serve you. Your representatives at the Capital and the heads of the transportation companies are doing everything within their power to solve this labour problem for you, and yet you know what occurs here almost every fall; there is either a surplus or a scarcity of labour.

Under proper conditions, that could be solved, and the difficulty entirely eliminated. You can see how readily the farmers in the eastern provinces take care of their work. In Ontario, where it is a common thing for a man to be farming 160 acres, they are always able to take care of their work, but there is no time since I have been in the province of Alberta that I have not heard a wail, either about too much help or not enough. The transportation companies are not wise enough to be able to distribute this extra labour just where it should be, and the government officials cannot do it without, perhaps, making errors that all human nature is heir to.

Now with regard to this weed question, I felt this afternoon like rising and saying a few words but I saw that the Honourable the Minister of Agriculture was fully able to take care of the question and did so ably, but I want to say to our friend, Mr. White, who suggested that the elimination of weeds was largely a matter of education, that if you could educate our people within any reasonable time and convince them that the destruction of noxious weeds was what they should undertake, and they did it, then you have accomplished what you want. I can recall when a boy that my father often impressed upon me the importance of education. He said it was the only road to knowledge, but I notice every time I played hockey he grabbed a great big club and speedily convinced me that the only way to get an education was to go to school. Now you cannot educate the farmers to eliminate the weeds without putting the police on. Harsh measures are necessary in some instances. You may perhaps call them severe measures, and I sometimes sympathize with the men in power. They are human as you and I are. They have difficulties to contend with, and if they use extreme, harsh or radical measures to enforce the laws, as they are expected to do, there is immediately a storm of protest—they are oppressing the people—and it is very difficult for them to know just exactly how far to go. But

there is a happy medium perhaps that can be struck, and the most flagrant cases may be taken care of better by the weed inspectors and penalized as the law provides. A few such cases would have an educational value.

Aside from the question of the farmer himself eliminating the weeds, I want to say a few words for the poor, despised, malodorous little sheep. There is a weed destroyer if you will. He is the greatest garbage collector I know of going about on four legs. There is no weed short of a Scotch thistle than he will not destroy. I remember when a boy, the pathmaster used to buy a bunch of sheep occasionally and put them on the roads to eat the weeds. Now it is hardly reasonable to say that the farmers of this country can all in one short season or two accomplish these results; that is physically impossible. There is too much country, but we hope in time the large holders of unprofitable lands will see the futility of their course, and will cut them up and sell them to somebody who will develop them. In the meantime the government policeman will have to keep busy. Hundreds of thousands of sheep are being imported into this country and we are paying a duty of twenty-five per cent on live sheep *ad valorem*, and we are down here in this country amidst a sea of weeds that could all be destroyed by sheep. That is not good business, gentlemen. I will venture to say there is not a banker, or a mill man, or a manufacturer in this country that would allow such a state as that to occur in his business. I don't think our farmers have realized as they should the necessity for improved methods.

Organization is the prime factor in marketing live stock and all the products of the farm. You all recall the early struggles of the fruit growers in California. They found themselves in possession of crops of the richest fruit-growing district on the North American Continent. They had the best transportation facilities and markets at their door and yet they found themselves facing a deficit every year. Why was that? Someone figured out one day that if they got together they would find out the leak. They called a meeting in one of the coast cities and they said they were raising good fruit and plenty of it but were not making any money. Labour was not high. What was the trouble? They discovered that it was due to lack of organization. They were marketing their fruit badly. If a city required one car there were three cars being sent in. They formed an organization, placed an officer at the head of it and assessed members a reasonable amount. They were fruit growers, not market men, and employed an expert who was familiar with conditions to market their produce. He established a system of communication with his various market centres whereby every hour of the day he had accurate information as to the requirements of the trade, and if Lethbridge required one car of lemons and Medicine Hat a car of bananas they were sent there. That was one of the results of organization. To-day the strongest union of producers in the known world is in the State of California. That is a hint as to what we can do in this province.

I want to impress on this audience particularly the necessity for producing live stock on these irrigated farms. It means a smaller farm. There is no man who can conduct our huge prairie farms successfully under a system of irrigation. It means the cutting of these large farms into smaller units; that means closer communication between the men who are living on these farms. It means better roads, weed elimination and organization, which spells success in the last analysis. You cannot possibly succeed without a proper organization. Take the railroad men, the mining

and steamship men; they have all got a working agreement between them. To use a vulgar expression, they do not tread on each other's corns. There is nothing illegal, immoral or unjust about it. It is just good business, and why a body of intelligent farmers—men who could make a success in almost any line of business—should fail as they have done to avail themselves of the advantages of organization is past comprehension. I will give them credit for this, that the United Farmers have accomplished great good in a number of ways. Perhaps the good they have accomplished has been more local than general, but it is the nucleus and with such an organization as I dream of the farmer should be king in this country. (Applause.)

Some may say that if we all go into live stock there will be a surplus. How absurd, when we are importing meat products from all points in the United States. Do you know that we brought over from New Zealand last season during the winter, on two ships, four thousand carcasses of chilled beef. Just fancy; that is carrying coals to Newcastle. Why, men, this is absurd; and they were carrying ten thousand carcasses of mutton, butter by the ton, and eggs by the thousand; and they should have been produced here on the farms of Alberta and Saskatchewan.

Now you would not, in the face of that, attempt to tell an intelligent man there would be an over production, with this country filling up as it has been doing during the last ten years. I happen to have a record in my office which I repeat because it is instructive and interesting. At one of the Canadian Pacific points of entry from the United States two years ago, we passed two hundred cars a day for ninety days containing immigrants and immigrants' effects. I will venture to say in those cars there was an average of three breeding cattle, that is six hundred a day, a steady stream for ninety days. But when you stop to think of the men, women and children in those same cars, then three head of cattle looks pretty small. If you carried a pro rata of stock, a well balanced amount as against your grain production, you would not catch the increase of population in this country in the next five years. Are you aware that Ireland sent over to England, two years ago, inside of twelve months, 571,000 cattle? Now I am told that the average export from that little island is about half a million a year, and when we send to the Old Country, as we used to, 50,000 in one year, the papers had scare headlines; and Ireland sends over there 500,000 and that does not begin to feed them. They are getting beef from every place they can. Why should you conjure up this bugaboo? Did you ever, since this population started to increase at all, offer for sale, even in our restricted markets, a good butcher's bullock that you did not get the worth of him and get a good fair profit? Under those conditions are we not perfectly safe in assuming that there is a market here for your live stock? Would one of you venture to say it is not profitable? Would you venture to say that seven cents for a beef steer is not enough? that eight and eight and a half cents for hogs is not enough? that \$135 for an ordinary horse is not enough? That being granted; it being assumed that there is a market; that the population of this country is bound to increase; it being admitted that better methods of farming will retain the fertility of our soil; that improved methods of irrigation will ensure our crops; that this is a good country; that the climate is good; that all being admitted, what is the objection to going into live stock? I don't think there is a man here can find a sole logical reason why it should not be made a permanent and inseparable part of the agricultural scheme of this province.

With regard to restricted markets, I want to say that every community, every city of any importance, or large town in this province should bestir itself to secure better market conditions. We want our markets centralized and made more competitive. We want, in short, not to be dependent on the will of any great man or firm or corporation. It is not, therefore, unjust, nor an insinuation of improper methods to demand and insist that you get better market conditions. A move has been made in Lethbridge which, if followed up, will regulate this. Calgary is waking up to the fact that things must be done differently. At Edmonton they have gone a long way to solving that problem. Your stuff should be worth its price in the world's markets. We know that the demand exists and is regular and continuous.

For these reasons and for a good many other reasons which I have recited, I would urge on you in my few concluding remarks to include in your scheme of agriculture the necessary amount of live stock to take care of all your surplus fodder. It would eliminate your weeds, add to the fertility of your soil, increase your profits, retain your self-respect when you see the kind of a home you are building up. You would not be dependent on storms, on the caprice of a hail storm. You have got your fat cattle, sheep and hogs and horses in the barn and perhaps a surplus of crop under cover. You are independent. You don't have to stand and watch the clouds and wonder if the storm is going to wipe you out of existence. It is conducive to better social conditions. It is only the beginning of the time coming when there will be more of the brotherhood of man. The small farm, the little red schoolhouse, the vine-covered porch. Surely all these things would be an improvement on existing conditions and are worthy of realization. (Applause.)

CHAIRMAN.—We will be glad to have a brief discussion on this paper.

MR. WHITE.—I would like to say a few words of congratulation to Mr. McMullen and say that is practical conservation of the very best kind.

Regarding the question of weeds, I would say that I have no idea of giving the impression that I thought the laws should not be enforced in their entirety. All I wished to say was that I think the ultimate solution must be done by the enforcement of the weed laws plus education.

MR. MUCKLESTON.—I would like to give a practical example of what we can do. Up in the territory in the neighbourhood of Bassano, not far from here, there is one more or less red-headed Scotchman who has about a thousand sheep and has a very restricted area in which to run those sheep. He is also located in a situation where a neighbour of his has done his best to illustrate what mustard can do when allowed to run at large, and our Scotch friend has done his best, with the aid of his thousand sheep, to show what can be done by the humble sheep. He has managed to demonstrate that mustard and stinkweed and the various other pests do not exist in the same territory as sheep. I also want to add to Mr. White's remarks and go a little further and ask the gentlemen who are here to join with me in a vote of thanks to Mr. McMullen for a very entertaining and instructive address on the subject assigned to him. (Applause.)

MR. LAWRENCE.—I think it becomes me, or anyhow, somebody from British Columbia to speak to that, and there is one thing I would like to say and that is that if Mr. McMullen could find the time or make an opportunity to come to Kamloops,

right in the centre of British Columbia, and deliver the same inspiring address he has done to-night, he would be the most popular man in a very large district. The instruction he has given is the very thing we want. Those of us who are trying to carry out this need a good deal of encouragement, and just such a speech as we have now listened to is the very thing we need in our district. If Mr. McMullen and, might I also say, Dr. Rutherford, would come, we should value their services in that direction more than I can tell. We would like to make an opportunity for them to come next year but failing, or even anticipating that, we would like them before. We will get them an audience they may be proud to address. (Applause.)

MR. GEORGE HATCH.—Since my old friend has referred to me, I want to say that we both came over a good deal of the same trail. We both lived in the Western States in the territorial days, in the old days of the desert and great range. We have both seen the development and Mr. McMullen has given you a very nice picture of what they have done there. I remember when we had to pioneer the roads for the stock, and I remember when we lay down in the hot sun and the stock would not travel and when my partner would jump up and say, 'Damn this great West. Here is the country that the United States Government is inviting the foreigner to. Here is some of it.' And it was a desert; and I would say, 'Now, don't get excited. We will come through here ten years from now and find this place right here all fenced up and a Dutchman on every quarter-section raising cattle.' Then he would go wild, but that condition is with the country to-day, largely through the agency of irrigation. In May of 1879, on the Yellowstone river, just below the city of Williamston, twenty-two acres of alfalfa were planted, and that same land is still cutting about six tons per annum.

MR. NATHRUP.—I would like to see the sheep put on the road allowances down here. There are several thousand very valuable acres.

A vote of thanks was then unanimously passed to Mr. McMullen.

CHAIRMAN.—I have much pleasure in introducing to you Mr. Walter Huckvale, one of the official representatives of the Cypress Hills Water Users' Association.

THE IRRIGATION FARMER.

MR. WALTER HUCKVALE.—Mr. Chairman and gentlemen, it was with some diffidence that I consented to accept the honour of preparing a short paper to read to you to-day, as I am not particularly well posted as to theories of irrigation, and though pretty largely interested in irrigated land, most of the practical part I have done by proxy; however, I have been interested in irrigation from a very early age and have seen something of it in various parts of the world, and I thought a short sketch of irrigation in different countries might interest you, and if it tends to do that and to show what an advantage (when not an actual necessity) it is in most climates, whether humid or arid, I shall feel that I have not taken up the time of this meeting altogether in vain.

I commenced taking an interest in irrigation at a very early age, as my father had some meadow land in the county of Oxford in England through which a small brook or creek ran, and I have vivid recollections of trotting after one of the men

and helping, or hindering him more likely, to dam the creek and turn the water into the ditches, which apparently had been there, from time immemorial, and perhaps my recollections may be rendered rather more vivid by the spankings I got when I came home well soaked from the scene of operations. The water was turned out in the winter, generally in January or February, and was put on most liberally, so much so, that often when a cold snap occurred we used to have the most glorious skating on the flooded meadows, and what a lush growth of hay used to follow, and what an aftermath of feed for the stock, one's recollections of that would surely induce anyone to use water on grass land whenever opportunity afforded. There is a considerable area of meadow land in England that is irrigated, some artificially and a good deal by the natural flooding of streams, but the only instances of the irrigating of arable land that I have seen or heard of are the sewerage farms of different cities which are at once an example of what an enormous quantity of produce can be grown through intelligent irrigation and fertilization, and also in showing how to dispose of sewerage in an economic and a hygienic method; it seems to me that in the future there will be many a town on these prairies without a natural outlet for their sewerage and that it would be a most useful and practical demonstration if the Department of Agriculture would, some time in the near future, take this matter up and inaugurate a sewerage farm adjacent to some town.

In travelling in Japan I was much amazed to note the enormous crops of vegetables grown by the aid of sewerage, though their methods are crude, and if hygienic are certainly not pleasant to either the sight or smell.

Japan is certainly the most completely irrigated country I have seen, with her teeming population and her small percentage of cultivatable land (only some thirteen per cent of the whole) it is highly necessary to take from that area all that it is capable of producing, and Japan is perhaps the most intensively farmed country in the world. Being largely a mountainous country, with a fair amount of precipitation, streams both large and small abound, and they are certainly taken advantage of wherever the opportunity affords. Rice, of course, is the staple cereal of Japan, and as that actually grows in water, it needs either a peculiarly advantageous lay of land or else a great amount of careful work to prepare the land for it, and the Japanese have certainly taken advantage of natural conditions, and where they were lacking have aided nature by artifice, and one sees rice paddies in almost inaccessible places. This has been accomplished, in the course of centuries I presume, by the terracing of hills and the diking of fields, till one sees a series of little plots, some not more than a few yards square, away up on hill sides as far as there is any soil and in ravines till they are naturally pinched out by the rocky sides of the hills coming together. I do not know whether there are many ladies in this country who take part in the actual work of irrigation or in the growing of crops under that method, but in Japan it is a common and not altogether a pleasant sight, to an occidental, to see women up to their knees in mud and slime of a rice paddy using something like a huge and clumsy mattock to turn the soil over with. There is one pleasing feature of Japanese life in this and other connections: we know that these women and men work under such disagreeable circumstances will, after quitting work, take a hot bath and be perfectly clean during their resting hours. The area of irrigated farm land in Japan to that of dry is about in the proportion of seven to eight, so it

is easy to appreciate the importance of this branch of agriculture. I might mention that in very recent years Japan has gone very largely in for tree planting, which will not only make a lot of hitherto unproductive hillside into a source of great national wealth, but will also aid greatly in regulating the flow of streams and stopping disastrous floods. It is hoped that our Federal Government will increase its efforts along these lines year by year.

I think very few of us connect the beautiful green and fertile islands of the Pacific ocean with irrigation projects, and the common idea when I was a boy was that anything and everything grew as if by magic in the 'Coral Islands.' I was somewhat astonished then when I learned from planters in the Hawaiian Islands, and afterwards confirmed their accounts by reading, of the very large irrigation projects that exist in those islands for the purpose more especially of growing sugar cane and by which means they obtain the largest production per acre in the world. The methods adopted are partly by means of reservoirs and partly by pumping from deep wells, many large plantations using both. Some of the pumping plants are immense affairs, one having a capacity of eighty-five million gallons a day—sufficient water to supply a city of several hundred thousand people. About half of the sugar crop of these islands is grown under irrigation; the other half, owing to location and different climatic conditions, does not need any artificial watering. Only one crop of cane is harvested every two years in the Hawaiian Islands but, as by means of irrigation and other scientific methods of production and manufacture, over ten tons of sugar have been obtained from a single acre, it is little wonder that in these islands sugar is king.

I saw a little irrigation work around Manila in the Philippine Islands, and there one sees some beautiful rice fields, large flats easily flooded producing a bountiful crop, but where irrigation is not easy it is not practised, and though rice is the staple article of diet of the Philippines and the country is admirably adapted for the growth of it, a large quantity has to be imported most years, if not every year. It is a most interesting comparison to make between the industrious and energetic Japanese, with his teeming population and small area of agricultural land, and the Philippino with his comparatively small population and his large area of most productive soil. However, comparisons are often odious, and it is quite possible that after generations of living in a tropical climate the most energetic of races might get to a point where the chief interest of life is not work but cock fighting, as it is with the natives of the Philippine Islands.

Farming is no doubt the oldest profession in the world, and it would seem that irrigation as an aid to it, if not used at the beginning, has been in operation from very early time. In India one sees, I should think, every form of irrigation that is practised anywhere, from the watering by hand labour of the small cultivator to the expensive schemes of huge reservoirs and canals undertaken by government. A very common method of irrigation is by means of oxen drawing water from wells by means of a huge skin bucket suspended by a rope from a pulley; water is drawn from wells as deep as one hundred feet, and it is astonishing what an area of land can be irrigated by means of these patient beasts, plodding backward and forward throughout the daylight hours. One can see so many ruins of reservoirs throughout some parts of India that it might cause a traveller to think that ages ago India was

probably far more irrigated than it is to-day, but when one comes to think that the life of a reservoir is necessarily limited by the amount of silt that is deposited in it, one can understand that many in course of time have been abandoned, as it was easier to create new ones than to clean out the old. The Indian Government have no doubt done a great work in aiding agriculture by means of large irrigation works, some of which have reclaimed large areas of arid lands and others which are only necessary in times of unusual drought but which at such times are the means of saving tens of thousands of lives.

In the northern part of Ceylon, which is a dry and level land and exceedingly hot, the colonial government have created a number of what looked to me pretty large reservoirs, some I saw being perhaps five or six miles long by half that in width and of great depth, but they are mere bagatelles to the ruins of reservoirs, or tanks as they are locally called, found throughout what is now jungles. The present system of irrigation in northern Ceylon is not taken advantage of to nearly the extent it might be, but the old systems probably flourished some five hundred years before Christ at the same time that the great wave of Buddhism passed over India and Ceylon and when the city of Anaradhapura flourished, the ruins of which are to be found scattered through sixteen miles square of jungle.

We are all more or less familiar with irrigation in Egypt by reading or seeing. I, unfortunately, have not had the opportunity of visiting that land yet, though I am living in hopes, so I have had to obtain what little knowledge I may have by reading, and hearing others that have been more fortunate. Egypt is, I suppose, the oldest irrigated country we know of, and irrigation is so necessary there that unless one's land is overflowed by the Nile one does not have to pay taxes on it, yet in spite of the ages that irrigation has been practised there, the rainfall is still a negligible quantity. I think that this should be a lesson to all of us to build our works in a permanent way, not only for a few years, as it is very doubtful if an increase of rainfall is caused by the irrigation of a part of any country.

In northern Italy one sees one of the most perfect systems of irrigation anywhere in the world, and as the canals are largely fed by lakes, they have not the same trouble that is found in places where the difference between high and low water mark is great. We are rather given to thinking that everything done on this continent is a little bigger and perhaps better than anywhere else, but when one considers that a comparatively small country like Italy has irrigation canals capable of carrying all the way up to 6,700 cubic feet of water per second and an administration of the water that practically never leads to litigation, we must confess that there is yet something to learn.

We are all more or less familiar with what has been done by both governmental and private enterprise in the United States and Canada, and I will not weary you much longer, but I should like to detain you for a few moments to speak of the system of irrigation in my particular part of the country. I speak of what might be called the territory of the Cypress Hills Water Users' Association. Our system of irrigation I believe differs from that of any other part of the country, though similar isolated instances may be found elsewhere. The particular difference that I refer to is the fact that few of us have command of a constant flow of water, but have to depend on the melting snow in the spring and freshets caused by the rains in the

summer. This may seem to be rather a capricious means of existence from an irrigation point of view, but the results that have been attained are in many cases really remarkable; and I should like to instance the fact that my partner and I drove Mr. J. W. Greenway, the Commissioner of Dominion Lands, some years ago through a strip of meadow that had only had one year's water applied to it, and kept the wheels of one side of the buggy in hay reaching up to the top of the front wheels while the other wheels were in grass so short and light as not to amount to any value at all.

So far the chief crop to be grown under this system of irrigation has been wild hay, but during the last few years timothy, alfalfa, brome and other cultivated varieties have been introduced with very great success, while there is no doubt that in most years cereal crops could be successfully grown. The great trouble, which so far as I have heard has never been conquered, is the growth of a grass locally called fox tail, which is of no value in itself, and renders hay which contains any great percentage of it harmful to stock. This grass apparently springs up without any sufficient reason, and abounds during one year and practically disappears during another under almost identical circumstances. The precarious nature of the water in many cases does not warrant ploughing up the land and seeding to tame grasses on a large scale, else that might tend to a large extent in eradicating this pest. Any suggestions or experience by irrigators who have been similarly troubled would, I know, be welcomed by a large number of men in the neighbourhood of the Cypress Hills.

As the land away from and surrounding the Cypress Hills is largely of what might be termed a light quality and as the precipitation is also small, the quantity of hay to be found growing under purely natural conditions is very little and the grasses, though very nutritious, are sparse and the land is not capable of being heavily stocked, especially without the stockman has some means of growing a fodder crop which will provide feed for the winter. Here comes in the value of an irrigated area larger perhaps than can be watered sufficiently every year. Given an area of land that a sufficient quantity of water can be put on to grow a hay crop in an average year, in a year when the flow is much under normal the result will probably be only good pasturage instead of hay, but under certain circumstances that would be very valuable, as I can instance in my own case. During the year 1910 the flow of the creek we use for irrigation purposes was smaller than in any other year of the last twenty and precipitation of that year was practically nil and the heat intense; I dare say many of you have cause to remember it; what little water came down our creek we used to the fullest extent, and though we did not have a tenth part of what we should have liked, still we covered a pretty large area, with the result that we had a considerable amount of good pasturage, while the grass that the water did not touch never grew at all, in fact large patches were actually killed out, roots and all. We had a large stock of hay left over from other years and the following winter we came through with no loss of stock whatever, though many of our neighbours lost heavily. I am citing an instance like this to show the value of using water from these temporary running creeks to the fullest extent, and I think every encouragement should be given to people who are prepared to use such water, coupled of course, with such rules and regulations as the department sees fit to make to prevent land speculation rather than land irrigation, and I cannot imagine any better use for a lot of rough and light land in some parts of this province and Saskatchewan to be

put to than to be used as pasturage in connection with an irrigated meadow even if the quantity of water available for that meadow is not quite up to departmental regulations. (Applause.)

CHAIRMAN.—This interesting address winds up the proceedings for this evening, and is open for discussion by any of the delegates. Before we adjourn I would remind you of the automobile trip for to-morrow morning, kindly arranged by the Borad of Trade of the city.



Automobile Parade, Lethbridge.

EXECUTIVE MEETING.

A meeting of the executive was held immediately at the close of the evening session. Hon. Duncan Marshall was in the chair and Messrs. Dixon, Pearce and Fairfield and Secretary Rankin were present. The secretary read the minutes of the last meeting of the executive.

Moved by Dr. Dickson, seconded by William Pearce, that the minutes be approved as read. Carried.

The secretary presented his financial statement for the year 1912-13, showing receipts amounting to \$4,523.29 and a balance in the bank of \$1,849.75.

Moved by Dr. Dickson, seconded by William Pearce, that Mr. H. J. Russell be appointed auditor of the accounts of the secretary, at a fee of \$10. Carried.

FINANCIAL STATEMENT, WESTERN CANADA IRRIGATION ASSOCIATION, 1912-13.

Receipts.

1912—Balance carried forward as per bank account.. . . .	\$1,923 29
Emergency cheque—Kelowna Convention expenses.. . . .	100 00
1913—British Columbia Government grant.. . . .	1,000 00
Alberta Government grant.. . . .	1,000 00
Dominion Government grant.. . . .	500 00

Expenditures.

1912—Expenses, transportation, &c., speakers to Convention at Kelowna.. . . .	\$ 401 35	
Emergency cheque—Kelowna expenses.. . . .	100 00	
Stenographer's report.. . . .	187 65	
Printing, badges, programmes, &c.. . . .	125 95	
Expenses delegates to Salt Lake Congress.. . . .	132 80	
Bonus to secretary.. . . .	200 00	
Secretary's salary for five months.. . . .	208 30	
Expense, visit to Ottawa <i>re</i> government grant.. . . .	9 20	
1913—Printing programmes, official calls, constitutions, badges, photos, dies, stamps, cuts, &c., &c.. . . .	465 61	
Expenses to business meeting, Victoria, secretary, local secretary and clerk.. . . .	174 90	
Stenographic report, Victoria meeting.. . . .	25 00	
Express, Ottawa-Victoria on annual report.. . . .	22 58	
Expenses, W. H. Pawson, delegate to Cypress Hills Water Users' Association from Western Canada Irrigation Association.. . . .	12 00	
Sundries.. . . .	1 80	
Secretary's salary for seven months.. . . .	291 70	
W. H. Fairfield, Local Treasurer, for local expenses, to be accounted for.. . . .	200 00	
Emergency cheque, secretary, to be accounted for.. . .	100 00	
W. J. Oliver, photos for publicity work.. . . .	14 70	
Balance.. . . .	1,849 75	
		<hr/>
	\$4,523 29	\$4,523 29

Certified correct.

NORMAN S. RANKIN,
Permanent Secretary.

I hereby certify that I have audited the accounts of the secretary, and find the foregoing financial statement to be correct.

H. J. RUSSELL.

August 6, 1913.

Moved by William Pearce, seconded by W. H. Fairfield, that a bonus of \$200 be voted to the secretary for his efficient work on behalf of the association during the past year. Carried.

Moved by William Pearce, seconded by Dr. Dickson, that a sum of \$200 be voted to Mr. W. D. Finley, Local Secretary, Lethbridge, for services performed in connection with the convention. Carried.



Ladies of St. Cyprian's Anglican Church, who served the luncheon at D. J. Whitney's farm.



Delegates after luncheon at J. D. Whitney's farm at Lethbridge.

WEDNESDAY, AUGUST 6.

The morning was devoted to the automobile journey described at length in the official programme. The delegates were out in force, and at the luncheon at Ideal Farm speeches of appreciation were made by the Hon. Duncan Marshall and Mr. W. C. Ives, President, Board of Trade.

WEDNESDAY AFTERNOON SESSION.

CHAIRMAN.—We are ready to resume business. I understand that the secretary has received some letters and telegrams, which he will now read to you.

The secretary thereupon read the following communications:—

(Telegram.)

VANCOUVER, B.C., August 5, 1913.

Greatly regret cannot come to convention owing to being called to Vancouver on business.

W. C. RICARDO.

(Telegram.)

KELOWNA, B.C., August 5, 1913.

Regret very much find it impossible to get away attend convention.

THOS. BULMAN.

SALT LAKE CITY, UTAH, August 3, 1913.

DEAR MR. RANKIN,—

I regret to find that owing to an extension of the trip I am at present making through the middle western states, I will be unable to return in time to attend the convention at Lethbridge on August 5. I am paying close attention to the various irrigation schemes I am inspecting in this part of the continent, and hope to obtain data and information which will be of interest to the association.

Please express to the president, executive and delegates my wishes for a successful convention and the continued success of the association.

Yours truly,

A. S. DAWSON.

Requests for copies of addresses were received from the *Canadian Engineer*, of Toronto, *Canadian Finance*, Winnipeg, and the *Engineering Record*, Vancouver.

CHAIRMAN.—I believe Mr. Armstrong, who is to deliver a lecture to us to-night, would like to say a few words with reference to the lecture and the moving pictures he is to show.

MR. ARMSTRONG.—That is scarcely so. I was asked to say a few words. I came here to learn. The subject was announced as 'The West of Pioneer Days,' but I expect to change that to a recital concerning the pioneer days in the east, with scenes of fishing and shooting. I think this morning is one of the most profitable I ever spent in my life. I have a mission to illustrate by pictures, and therefore I much appreciated what I saw this morning. The Canadian Pacific Railway is establishing lectures bureaus probably all around the world, but certainly through the United



D. J. Whitney, owner of the Ideal Farm near Lethbridge.

States and Europe, to tell the people what good and cheap lands are to be had here and how to come. These pictures serve a necessary and useful purpose, and as an example I remember a strapping young fellow whose father was a successful merchant in Bond street, London, and who had given his son three hundred pounds or \$1,500. He asked my advice and said to me, 'I don't know anything about farming.' I said, 'Work a year on a farm and put your three hundred pounds in the bank and at the end of the year you will have three hundred pounds and the experience.' He said, 'I think that is right.' So I brought him out to a thoroughly good farmer in Manitoba, where there is a good deal of scrub oak. At breakfast, the first day, my young friend said, 'I am ready; what is there to do?' The farmer said, 'Here is an axe. I want to put up a good sized fence. Cut the posts nine feet high and make a good solid fence.' Well, I went out and when I came back several hours later for dinner I saw that young fellow chopping away. The farmer's wife blew the horn and he came in with his arms scratched and in a great state of perspiration. I said, 'How did you get along?' He said he had cut four posts and was on his fifth. That was four and a half hours' work. Of course, we all looked. He said, 'To cut posts nine feet high is the hardest work I ever did in my life.' (Laughter.)

CHAIRMAN.—The first address this afternoon deals with the culture of alfalfa, by Mr. W. H. Fairfield, Superintendent of the Dominion Experimental Farm. Most of those present, I think, saw Mr. Fairfield's alfalfa to-day and will be perfectly satisfied that what he says about alfalfa will be just about right. (Applause.)

Mr. W. H. FAIRFIELD.—Mr. President, ladies and gentlemen, I am afraid that Mr. McMullen, in his very interesting address last night, stole some of my thunder, but this question is of such vital importance to the localities in this part of Alberta and Saskatchewan, where irrigation is practised, that perhaps we may be forgiven if we are guilty of some repetition in the hope that we may add emphasis.

ALFALFA GROWING IN WESTERN CANADA.

Alfalfa growing and irrigation go hand in hand in western America. Without question the success of most of the irrigation projects in the western states to the south of us depends largely on the fact that alfalfa grows with such luxurious abundance when water is applied, and if it did not thrive as it does the agricultural possibilities of these projects would be seriously curtailed.

Alfalfa was originally a subtropical plant, having been grown and highly prized as a fodder plant in the vicinity of the Mediterranean for several centuries before the beginning of the Christian Era. The Spaniards introduced it into America by bringing it to Mexico and South America, and from there it was carried north into California, thence east into Utah and from there its spread clear to the Atlantic was rapid. It is now said to be grown in every province of Canada and in every state of the United States, though in some cases its culture is limited to small areas. Its range of adaptability is wonderful, for from even as far north as Fort Vermilion the last report states that it is doing well. Although it will grow under such a wide diversity of conditions in regard to climate and soil, still it is under irrigation that this wonderful forage plant earns its greatest popularity.

In regard to what is being done with this crop in the Canadian Northwest, I may say that it is now being grown in limited areas quite generally in various parts of Alberta, Saskatchewan and Manitoba. Professor S. A. Bedford, Deputy Minister of Agriculture for Manitoba, states in a recent letter to the writer:—

‘The area of this legume is increasing very rapidly each year, and it is now possible to find fields of from ten to thirty acres in different parts of the province. This government has about twenty different plots of one or two acres in area planted in different parts of the province, from altitudes of 1,000 to 2,500 feet above sea-level, and so far they have almost without exception proved successful. The only failures are attributed to insufficient drainage in one or two portions of the Red River Valley.’

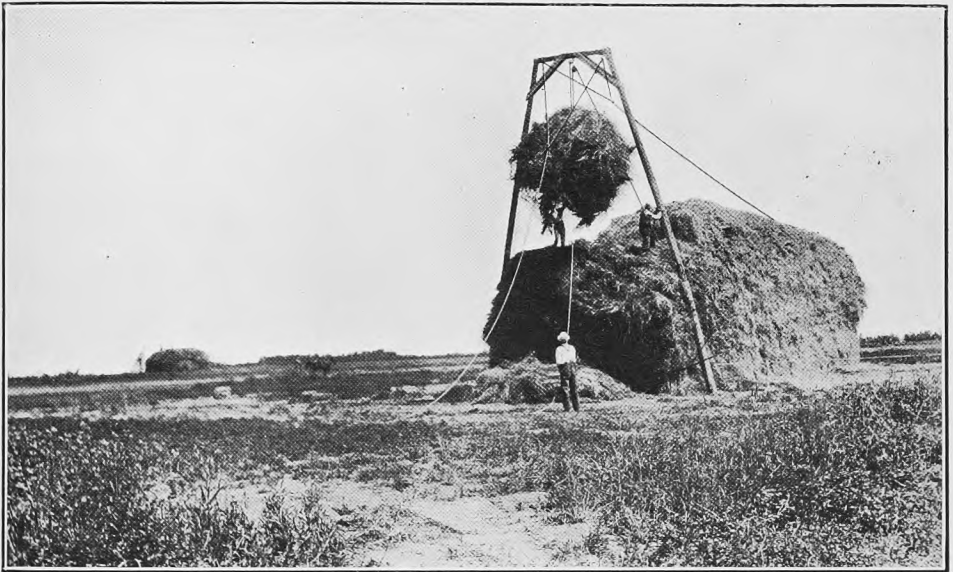


Cutting Alfalfa near Lethbridge.

In Saskatchewan, fields and plots of alfalfa may be found in many localities from Prince Albert south to the boundary, although previous to 1904 it was almost unknown in that province. The Saskatchewan Government is giving the growing of

alfalfa a great impetus by offering liberal prizes aggregating something over \$6,000 for the best ten-acre fields, to be judged in 1914. The exploitation of this contest, with the necessary attendant publicity, is doing a great deal in the way of influencing farmers to begin the growing of this forage crop.

Alberta is the premier, so far as the prairie provinces are concerned, in the growing of alfalfa. It is so generally grown in the extreme southern portion of the province that the experimental stage has long been passed, but farther north it is being tested quite generally, and it is gratifying to know that in the majority of cases the farmers are meeting with success. Where failures are met with it is usually due to lack of inoculation or to the use of strains of seed not sufficiently hardy. Although the common strains, or so-called varieties, all seem to be hardy in the Leth-



Stacking Alfalfa with slings on Government Demonstration Farm, Lethbridge.

bridge district, this does not appear to be the case in the other parts of the province. At the Dominion Experimental Station at Lacombe serious winter killing has been experienced, except with the Grimm and Turkestan varieties. Failures in certain parts of the province to get the crop to live through the winter has doubtless been due to the fact that the seed used has come from some of the warmer parts of the United States where hardy strains have not predominated. I believe that most of the failures that have been met with in the Gleichen and Strathmore districts have been due to this fact, for the writer has visited fields of alfalfa in these districts that are two and three years old that were in as vigorous and thrifty a condition as one could desire. I firmly believe that it is only a matter of time till this kind of forage crops will be grown quite generally in practically all of the present settled parts of the prairie provinces.

Where it will be always grown with the greatest profit will, I believe, be in the irrigated districts of Alberta and Saskatchewan. Here it is destined to become the

leading factor in our crop rotations. It will not only produce more pounds of the most desirable feed for all kinds of growing stock and milch cows, but it adds nitrogen and humus to the soil, enriching it in these essentials to a wonderful degree. A ton of well cured alfalfa hay has about the same feeding value as a ton of bran. The high regard that dairymen have for this hay is so well known that it scarcely needs mentioning. For feeding and fattening cattle and sheep it has few peers. In a lamb feeding test at the Lethbridge Experimental Station a year ago we found that we obtained about twenty dollars a ton for the alfalfa hay fed. In a similar experiment carried on with lambs this past winter we obtained nearly as much. As a pasture for pigs it is hard to equal. Brood sows relish the hay in the winter time. As a poultry feed it commands a high price when chopped and ground into meal. But why take up your time in cataloguing the many virtues of this wonderful forage plant which are doubtless well known to all present.

The Lethbridge district has the distinction of being the first locality in the prairie provinces to grow alfalfa commercially. The first fields to be grown successfully were sown twelve years ago. From the small beginning of a few acres the area devoted to this crop has increased, till now we have in this district about 10,000 acres and it is being increased by several hundred acres every year. This acreage is practically all on irrigated land. It will grow on dry land, but the tonnage is increased so materially by irrigation that we look on it as essentially an irrigated crop. It is peculiarly well adapted for growing under irrigation, for if the water is not applied just when it should be the crop is not damaged; the only loss is the loss of growth up to the time of irrigation. This is the case with few other crops, for with most grasses or with grain crops, &c., if they suffer from drouth at the critical period in their early development the crop for that season is seriously affected. During the hottest months of the year—July and August—which are usually the driest, we get the greatest growth by being able to supply the necessary moisture.

As previously stated, alfalfa is going to play a very important part in the rotation of crops raised on irrigated land in Alberta and Saskatchewan.

In most countries a leguminous crop, such as clover, is grown at certain intervals to enrich the land and so make it more profitable to raise other crops. In the case of alfalfa, however, it being such a valuable as well as prolific crop, the arrangements of the different crops will be changed and it will itself be the main crop grown. The great advantage gained will be that the land will be continuously enriched by nitrates and humus. Nature has been generous and has supplied the prairie soils, and subsoils too, with a bountiful supply of all the mineral constituents that plants require. Consequently it will be possible to keep on raising alfalfa probably indefinitely as far as the soil is concerned. I believe that within a short time sixty to seventy-five per cent of the land under irrigation in this district will be growing alfalfa. Other crops will still be grown, but by rotating them with alfalfa the yields will be increased 50 to 100 per cent. In support of this statement, I might say that on the Station last year we had potatoes planted on alfalfa sod that yielded 757 bushels per acre; spring wheat that followed the potato crop yielded 59 bushels per acre. It will be possible to double our yields of sugar beets. In fact alfalfa is going to be the basis, directly and indirectly, on which the development and wealth of the irrigated sections of southern Alberta are going to be built, and of course the same is true of southwestern Saskatchewan.



Stacking Alfalfa by use of sweeps on Government Demonstration Farm, Lethbridge.



Stacking Alfalfa by use of sweeps on Government Demonstration Farm, Lethbridge.

The weed problem, which is such a serious menace just now in this district and which is causing the farmers so much inconvenience, becomes insignificant when alfalfa appears, for the growing of this crop on irrigated land is a panacea for all such troubles, for none of the ordinary weeds can live in an alfalfa field that is being cut two and three times during the growing season. In regard to the yield of alfalfa that we get here, I may say that on the Experimental Station we have, during the last five years, since the farm has been established averaged between five and six tons per acre of field-cured hay each season on land that has been carefully irrigated. We cut either two or three times each year. There is not much difference in the total yield between the two or the three cuttings. If, however, the hay is cut three times instead of twice a little better quality for cows and sheep is obtained. It is less apt to be woody and is more palatable. The usual practice is to irrigate for each cutting, that is, just after the hay is taken off. Fall irrigation just before the water is turned out of the ditch has been found to be particularly advantageous, for with it, it is generally possible to make the first crop the following spring without applying any water.

We sometimes have difficulty in getting the first cutting cured as it is made in the latter part of June, which is often a rainy season with us. It is just possible that with the development of the district we may, in time, use silos in which to store our first cutting when we have to make it during inclement weather.

This naturally leads up to the question of stock. With the great increase in acreage of alfalfa that we confidently expect, it will be necessary to have stock to consume it. Doubtless more or less breeding stock will be kept on the irrigated farms, and each winter these will probably be supplemented by range stock. We hope that the foothills and mountains immediately to the west of us will be able to graze a large number of these during the summer time and thus increase the supply.

As successful farming under irrigation means intensive farming, and as intensive farming means increased yields, it naturally follows that we shall be able to maintain more stock per acre than will be the case in other parts of the province where they have not the advantage of irrigation.

I firmly believe that the irrigated districts in this part of the country will eventually be the heaviest feeding grounds in western Canada. (Applause.)

CHAIRMAN.—Discussion is now in order.

A DELEGATE.—I would like to ask what are the relative values of clover and alfalfa as feed.

Mr. FAIRFIELD.—There is not a great deal of difference. Alfalfa is a little richer in protein, about ten or twelve per cent.

Dr. DICKSON.—I would like to ask what would be the average cost of producing a ton of alfalfa, in the first place put into the stack and in the second place baled.

Mr. FAIRFIELD.—I cannot give you the exact figures, but approximately where alfalfa is put into hay by contract, the usual price is from one to one and a half dollars per ton for cutting and stacking. The cost of irrigation is in the neighbourhood of forty cents an acre for each irrigation. The cost of baling is from two to two and a half dollars a ton. That is the cost of a contractor.

Mr. IVES.—What cultivation should be done before alfalfa is sown?

Mr. FAIRFIELD.—We find that if two or three crops of grain have been grown it is quite satisfactory—that the land is usually in a satisfactory condition to sow alfalfa. A great many new-comers are anxious to get alfalfa sown the first year upon the land. This we find is feasible if the work is carefully done. I mean the first year after the land is broken. That is, if the land is broken early in the spring it is possible to backset that in August or September and have the land in quite good condition to sow alfalfa the following spring.

Dr. DICKSON.—Perhaps Mr. Fairfield might just enlarge a little more on the question of cost. My idea was to try and get at the average cost to produce one ton of alfalfa, labour, irrigation and everything.

Mr. FAIRFIELD.—Assuming that the average yield of alfalfa is four tons to the acre, our water rental is a dollar an acre; that means twenty-five cents a ton for water rental to the ditch company. Then forty cents for three irrigations, about \$1.20 a year an acre, divided by four to get your labour. Then one to one and a half dollars a ton for putting into hay in the stack and two to two and a half for baling it.

A DELEGATE.—You might call that three dollars, two for cutting and stacking.

Mr. FAIRFIELD.—Well it varies, of course, these figures are only approximate.

Mr. KELLY.—In preparing the seed bed for alfalfa, is it the custom to drain the land? I am not sure that you use the word drain in the sense that we do in Australia. What would be the cost of preparing the land in the way of what we would call draining it before seeding? I am very much interested in this as I come from an alfalfa growing district.

Mr. FAIRFIELD.—We do not find it necessary to give our land any further preparation than we would in preparing it for wheat. Our land in this district is level enough so that we do no levelling beyond any irregularities that might be caused by the ploughing, such as filling in dead furrows.

Mr. KELLY.—Thank you. Although our land is also level, very similar to your farms, yet we go to a lot of expense and trouble in draining it, and then we check it back into small sections so that when it is flooded the water will lie on every foot of the land. Your crop that I saw this morning is an excellent one, but I noticed that some of the leaves were spotted and was wondering as to the reason. I thought possibly some of the water had been lying upon portions of the land sufficiently long for the alfalfa to be scalded by the effect of the water and the sun.

Mr. FAIRFIELD.—I think I understand what you refer to. We do not check up our land. We use the flooding system, without any checking or furrows. The point you speak of in regard to the leaves of the alfalfa changing colour is possibly due to a little irregularity in the amount of water applied, but with any reasonable care that amounts to so little that we ignore it.

Mr. KELLY.—Thank you very much. I have enjoyed your paper very much. It occurs to me also that where we have such retentive soil we would flood the land immediately before cutting.

Mr. FAIRFIELD.—We irrigate both before and after cutting. Usually after, because it is a little easier to see where the water is going. If the land is not irrigated just before we cut, the hay cures a little quicker.

Mr. KELLY.—We have followed both practices and have given the matter most minute study in Australia. Of course, the climate is somewhat different.

Mr. JENNINGS.—I notice you have some planted in rows on the Farm and some with the ordinary seeder. Is there any advantage in the rows?

Mr. FAIRFIELD.—That was planted on dry land with the idea of raising seed.

Mr. E. FOLEY-BENNETT.—What is the total tonnage for the season?

Mr. FAIRFIELD.—We get two cuttings and if we cut it right on time we can get three cuttings. If we get three cuttings we can get an average of nearly two tons per cutting. If we only get two cuttings, each cutting is usually quite a little bit over two tons of field cured hay.

Mr. CURRY.—Have you ever experimented by putting it in rows and cultivating between?

Mr. FAIRFIELD.—Yes, we have done a little, but not very much. We find that in dry years we can get considerably more hay when it is put in rows and cultivated on dry land than where it is sown in the ordinary way, and it certainly is the right way to raise seed.

Dr. DICKSON.—Do you use an alfalfa renovator?

Mr. FAIRFIELD.—No; on the Farm we have disced the land some and harrowed it, but so far we have not been able to show that any appreciable advantage is gained by using the appliance you refer to. I think it depends a great deal on the soil. Sometimes it is beneficial and at other times it is not of much advantage.

CHAIRMAN.—We have with us this afternoon Mr. John T. Hinkle, Secretary of the Oregon Irrigation Congress, Hermiston, Oregon, who will speak to us.

COLONIZATION AND THE IRRIGATOR.

Mr. JOHN T. HINKLE.—The principle underlying all schemes of colonization is to bring idle and unused land into the possession and occupancy of men who can and will occupy and use it.

The man who through wealth or force of circumstance becomes the owner of more land than he can use himself must devise ways and means for its disposal on terms reasonably profitable to himself and yet sufficiently liberal to induce others to take it. He cannot set an arbitrary price and say, 'I shall have so and so.' Idle land is an extravagant luxury in any country where the tax collecting machinery works as well as it does in the provinces of western Canada, or the Pacific coast states of the United States of America. So the owner must sell his surplus land at one price or another and natural conditions and circumstances regulate and insure a reasonable price.

The first essential in any colonization scheme is the selection of the blood that is to flow through the veins of the colony. It should be pure and healthy blood, untainted by crime or dwarfed by conditions of vice and immorality. It should be that class of blood that will intermingle with our blood and flow strong and vigorous through the generations yet unborn and so on down the centuries a factor in the development of a race for which we hold and cherish our fondest hopes.

Therefore, in the colonization of our lands, we must look for the best and accept nothing short of the best. The selection should be judged by the blood, by the inherent vigour of the race, by the adaptability of the man or woman to the climatic conditions and fitness for agricultural pursuits.

The classification by valuation in dollars and cents is entirely a secondary and unimportant consideration. One family of healthy, vigorous blood and thrifty habits directly from northern Europe without a dollar in the world, is a more valuable asset than a rich man with a taint of idleness and vice in his blood. In the one case the owner of the land would ultimately be paid for it, and in the meantime he would have built up a strong and enduring friendship. In the other case, ingratitude, trickery and possible injury to life or property might be anticipated.

Most men live and die in the vicinity of their land transactions. Their children grow up, marry and raise families in the environment their parents have made for them. We must reap as we sow. We may think we can sell and get away but there is no get away. There is but one way to do business and that is to do it as though we expected to live and die alongside of each particular transaction.

The second important phase of the colonization question is the relationship of the colonist to the man from whom he purchases his land. A fatal error has always been made in drawing a class distinction between the land owner and the land buyer. It is an imaginary distinction. It has no foundation in fact. It is a relic of feudal ages that should have been forgotten long ago. Frequently the man who sells is poorer than the man who buys. Some are land poor. Some are railroad poor. Some are rich to-day and poor to-morrow. All are poor in one way or another. So the seller and the buyer may as well get down to a common level and a better understanding of each other.

Our land sale system is working into a great credit system. Time payments extend over long periods. Two men enter into a partnership arrangement. It may run for one, it may run for twenty years; one furnishes the land, the other furnishes his labour, his live stock, farm machinery, houses and barns. Both expect to get something out of the particular tract of land which they have selected for their operation; the one his money, the other his living and ultimate title. Should crops be short or other misfortune fall upon the occupant, his partner in the enterprise should know the reason why and make allowance in principal and interest payment. Should the occupant have an exceptional good crop and price he should pay more of the principal.

A salesman of the Canadian Pacific said that its land sales system was the most perfect in the world from the point where the name of the prospective purchaser was secured to the point where the contract was signed, the money paid and the purchaser installed upon the land. Then they forgot the man. Why forget him? You are not doing business for to-day nor to-morrow. Your land will not be all sold to-day nor

to-morrow. That man's success upon the land may mean a thousand additional sales. His failure on the land may seriously affect every part of the sales system throughout the world and either prevent sales altogether or double or triple the cost of making a sale.

So you are not done with a man when you sell him a piece of land. You should not sell him if you think he cannot succeed. And if you do think he can succeed, you should make it your business to see that he does succeed.

Our great transportation companies cannot do too much for the settler on the land. In recent years the railroad companies in the Pacific coast states are awakening to a full realization of this fact. They are employing more industrial agents and entering into closer and heartier co-operation with our experimental farms and state agricultural work.

The development of territory already traversed is of more importance than the extension of new lines. This is especially true of districts under irrigation or more densely populated due to diversified farming. It is conservatively estimated that every acre of irrigated land in hauling distance of a railroad increases the annual receipts of that particular road at least \$5. I farm 240 acres to alfalfa within two miles of the railroad. It produces an average of six tons per acre. I bale the hay and ship to Portland, 200 miles, for \$3.15 per ton. The road, therefore, receives from me in increased traffic \$18.90 per year upon every acre of my land. The Oregon Short Line a few years ago was dangerously near the hands of a receiver. The wonderful development of irrigated lands along that road in the states of Idaho and Oregon enabled it to pay eleven millions in dividends last year.

So our railroads and our governments must work hand in hand in every possible way to maintain and encourage the settler on the land. They should not only provide occasional lecturers but should employ a great number of brainy and experienced men to furnish help and advice to the farmer in every community or settlement where new people are dealing with the problems that confront them in a new country.

The man who enters virgin territory for the production of grain or undertakes the reclamation of land by irrigation is a pioneer and a patriot. He is the pathfinder, the demonstrator, the forerunner of wealth and civilization. He comes of honourable stock and inherits the courage and bravery of his ancestors who in the long years past crossed the Atlantic in search of new lands and freedom of thought and religious worship. He comes new to a new land and new dangers. His call is the greatest call that can come to man. It is a call to hardship, a call to danger, a call to unrelenting toil. But his reward, when it comes, is commensurate with the greatness of his call. His hand will plough the great fields. His hand will plant the tree and vine. His cottage will brighten the monotony of the plain. His wife will prepare the noonday meal. His children will laugh and play upon the lawn. The sun will shine upon that home. The flowers will bloom and spread their perfumed fragrance to the evening air. The man will have built a home which he can say is his. He will be happy because he possesses all a man may hope to live for—home, wife and child, and the honour and respect of his neighbours and friends. This man should receive all the help and encouragement it is within the power of his government and its institutions to give.

You should be proud that your great western provinces of Canada have so many thousands of such men. They are empire builders and they are building greater empires than were ever dreamed of by your ancient kings.

Here in the great Northwest Territory—that vast undeveloped country—that unmeasured expanse of wild grasses and wild birds and beasts, unknown to my generation except as marked upon the map of our school geography as an uninhabited, useless waste, constantly associated with the thought of icebergs and Arctic exploration—here we find springing up like mushrooms in the night, thousands upon thousands of prosperous homes, modern and populous cities with every evidence of modern comfort, convenience and luxury. And the inevitable conclusion is that our historian was ignorant and our geographer was a fool.

Your progress here within recent years has amazed the world, contradicted and disproved all former conceptions and attracted the eye and ear of the homeseeker in every land. What you may do in the next generation is beyond and above your most sanguine expectations. Your soil is rich as cream. Your climate is splendid. The personnel of your citizenship is excellent. All that is possible for any country is probable and certain for you.

I have come a long way to verify the reports concerning your wonderful progress and prosperity. I have traversed your broad fields of grain, witnessed the demonstration of your irrigated lands, admired the cleanliness and architectural beauty of your cities. I have enjoyed the hospitality of your homes. I admire your stalwart men and I love your pretty women. I predict for you a destiny that only strong men and strong women can attain—a wealthy and prosperous nation of people second in style and class to none other upon the face of the globe.

Do not taint this splendid foundation with the intermingling of bad blood. Do not commercialize this perfect type of manhood. Do not inter-marry this excellent type of womanhood with retrograding races. Colonize, as you must, but colonize with the hardy races, strong and vigorous in heart, lungs and brain, never forgetting that inherent courage and indomitable will power are essential in all who join you in the future growth and development of this great country.

You have adopted this country. You have cut the bridges behind you. It is your country in which to live and mayhap to die. You love it and would glory in its future greatness. Then make it your business to keep it clean and let nothing swerve you from a determination to make it a country in which you will be proud to live and not ashamed to die. (Applause.)

‘Behind him lay the grey Azores
 Behind the Gates of Hercules;
 Before him not the ghost of shores,
 Before him only shoreless seas.
 The good mate said: “Now must we pray,
 For Lo! the very stars are gone,
 Brave Adm’r’l, speak, what shall I say?”
 Why, say: “Sail on; sail on; sail on; and on.”

"My men grow mutinous day by day;
 My men grow ghastly, wan and weak."
 The stout mate thought of home; a spray
 Of salt wave washed his swarthy cheek.
 "What shall I say, brave Adm'r'l, say,
 If we sight naught but seas at dawn?"
 Why, you shall say at break of day,
 "Sail on; sail on; sail on; and on."

They sailed and sailed, as winds might blow,
 Until at last the blanched mate said:
 "Why, now not even God would know
 Should I and all my men fall dead.
 These very winds forget their way,
 For God from these dread seas is gone.
 Now speak, brave Adm'r'l, speak and say"—
 He said: "Sail on; sail on; and on."

They sailed. They sailed. Then spake the mate:
 "This mad sea shows his teeth to-night.
 He curls his lip, he lies in wait,
 With lifted teeth, as if to bite.
 Brave Adm'r'l, say but one good word:
 What shall we do when hope is gone?"
 The words leapt like a leaping sword:
 Sail on; sail on; sail on; and on."

Then pale and worn, he kept his deck,
 And peered through darkness. Ah, that night
 Of all dark nights. And then a speck—
 A light! A light! A light! A light!
 It grew, a starlit flag unfurled!
 It grew to be Time's burst of dawn.
 He gained a world; he gave that world
 Its grandest lesson: "On! sail on!"

(Applause.)

CHAIRMAN.—Perhaps some of the delegates have some remarks to offer in connection with the question of colonization.

Dr. RUTHERFORD.—Mr. Chairman, ladies and gentlemen, I am sure that I express the sentiments of everyone here when I say that we must yield the palm to Mr. Hinkle as the most telling orator, so far at least, of this gathering. (Applause.)

I am sure that every man who was here and who had the privilege of listening to his address, not only appreciates its beauty but will carry away with him a very keen recollection of some of the salient and incisive thoughts which Mr. Hinkle so forcibly and well impressed upon us. It is not only a good speech. It is the speech of a thoughtful man, of a man who does his own thinking.

I think, however, I would like to set Mr. Hinkle right on one point. That salesman whom he met in Salt Lake City was certainly misinformed as to the policy of the Canadian Pacific Railway in regard to the settler after he is on the land. The Canadian Pacific Railway, which is jocularly termed by some of its friends, and those who are not quite so friendly, as 'The benevolent Despot of the West,' does more than merely place the settler on the land and is doing more and more every day. It has realized the necessity so clearly brought out by Mr. Hinkle, of looking after the settlers and of standing, to a certain extent, in *loco parentis* to the settler. It not only provides him in many cases with a house, buildings and well, but also looks after his welfare in every possible way. The work in which I am engaged, namely, the agricultural work in the Department of Natural Resources, is entirely in the interests of the settler, and of course the company hopes some day to reap a benefit in the way of increased freight and so on. But the company is spending hundreds of thousands of dollars, for instance, in furnishing the settlers on these lands with breeding cattle. We have brought in thousands of the best cattle that could be purchased in the East or elsewhere for cash by the company and have resold them at cost to the settlers on easy terms. Inspectors of the company visit these men from time to time to see how they are getting along and encourage them in every possible way. We also endeavour to find markets for their produce, and we have an Agricultural Department which is now establishing for a beginning, a dozen demonstration farms to show the advantage of mixed farming in these three great provinces, three in Manitoba, four in Saskatchewan and five in Alberta, in addition to the big farm at Strathmore.

My office is rapidly becoming a bureau of general information. If Mr. Hinkle would come around by way of Calgary and do me the honour of calling in at my office and would look over the letters that reach my desk every morning asking for all sorts of information, and would see the staff of experts who are carefully studying out the various complex problems presented for our solution, and the long fatherly letters of advice in reply, I think he might change his mind in this connection. But there is a happy medium, and in my opinion, after thirty years' experience, it is possible to do too much for a good many of the incoming settlers. One has to be very careful and study the eccentricities of each individual before deciding how much we are going to do for him. We find some lose their hardiness and lie down on the company and ask us to do a great deal more than we ought to do for them or anybody else. I was very much impressed with Mr. Hinkle's remarks regarding the class of people, the necessity for having people who love the land. There is not enough selection, not enough care displayed in the selection, and in assisting some of those bad selections it is possible to do a great deal too much and instead of helping a man you pauperize him and make a worse job of him than if you had followed the old principle which worked very well in the early days of this western country, when the homesteader got out and dug for a living. I must again congratulate Mr. Hinkle on his very able address and the audience on having had the privilege of hearing him. I thank you for your consideration. (Applause.)

CHAIRMAN.—I will now call upon Professor Elliott, Dean of the Provincial Agricultural School, Olds, Alberta, who will speak in connection with government education in connection with agriculture.

GOVERNMENT EDUCATION ALONG IRRIGATION LINES; OR WHAT THE PROVINCE THROUGH HER AGRICULTURAL SCHOOLS CAN DO TO ASSIST IN THE INTELLIGENT USE OF IRRIGATION WATER.

Professor W. J. ELLIOTT.—In dealing with this subject, my remarks necessarily will have particular reference to Alberta conditions, and what the Alberta agricultural schools can do to assist in the matter; and yet at the same time, most of the points dealt with will apply with equal force to all irrigated districts.

Alberta to-day has a total area of 162,765,000 acres. Of this area 100,000,000 acres are what might be termed arable land, and of this 1,500,000 acres are irrigable. The irrigable area covers projects now under way as well as those already completed. Of course, this does not include projects which are under consideration at the present time or which may be developed in years to come, and which may double this amount.

Generally speaking, irrigable land has a value of two to three times that of non-irrigable. Of course there are the districts where fruit or intensive vegetable culture may be undertaken, and where the relative value may be much greater than three to one, but for what might be termed ordinary agricultural pursuits along mixed farming lines, the comparative value may be somewhat as indicated above, *i.e.*, two or three to one. When we take this comparative value into consideration, it gives our irrigated areas relatively a very much higher commercial and economic value than is represented by the actual acreage covered by the ditch. Hence, in comparing the relative importance of the various classes of agriculture, we must take this fact into consideration. I may say that it is the intention of the schools of agriculture in opening up the courses of study for the agricultural students to be established next fall, to give every possible consideration and help to every phase of agriculture that is represented in the province.

We think we are perfectly safe in saying that there is abundant need for education along the lines of the intelligent use of water in our irrigated districts. As a general rule, the expense of putting water on an irrigated area is quite heavy, and this very fact, we think, in a great many cases, has led to a very serious mistake on the part of the government or corporation or group of individuals who were concerned in the development of the scheme. It is natural to suppose that those who were concerned in the outlay of large sums of money to prepare the project for settlement should be anxious to have the area settled up as quickly as possible, and in too many instances this eagerness for settlement has produced a very serious condition.

In too many instances, sufficient care was not exercised in the matter of securing those who have had practical experience in irrigation matters and who were likely to make a success of the project. The main object seemed to be to sell the land. The land was simply sold to any one. This policy brought on to the land as first settlers, just as many of those who had no conception of what irrigation meant, as of those who had large experience. There are instances all over this continent where the first settlers on the irrigation schemes made miserable failures in their attempt to develop their farms. This may have been due to utter lack of knowledge as to all matters

pertaining to agriculture, or it may have been due to the fact that they were not familiar enough with the soil and climatic conditions, but in most cases, it was due to the fact that they knew nothing whatever about it.

But the fact remains that they were not a success. Such settlers not only hurt the irrigation project, but hurt the whole cause of agriculture.

To our way of thinking it were far better to go slowly in putting the first settlers on any irrigation scheme. Select those settlers with the utmost caution as to their ability to succeed. Start with comparatively few settlers and see that they are successful. This may on first thought seem to delay the settlement and delay that time when revenue is hoped for, but a few successful settlers will produce confidence, and confidence is the greatest aid to settlement.

Such a method of settlement avoids all dangers attendant upon the efforts of the inexperienced irrigationist. Too many men who begin to farm under an irrigation scheme imagine that the application of water is all that is necessary. In fact, they eliminate the idea of cultivation altogether, or nearly so, and for cultivation substitute the application of water. To one who is familiar with the subject, this spells disaster from the start, because it is simply a system of a lazy man's way of doing his work. As a consequence, we frequently find that large areas are drowned out. Water has been applied to the land in such quantities and to such an extent that the water table in the soil has been raised too close to the surface, and in many cases has been raised above the surface of the ground—thus making low, swampy and flooded areas. This is a disastrous condition and leads to the expenditure of large sums of money for reclamation. Ditches have to be dug to intercept the flow of the excess and seepage water towards the lower areas, and the lower areas have to be drained to make them again productive. Conditions as I have just mentioned are not found in isolated cases, but are conditions that will be found to prevail in a great many sections of this country where irrigation is new, and in some sections where irrigation has been practised for a considerable number of years. There is indeed need for education along the lines of irrigation matters. People need to know more about the soils of the West. They need to know more about the water-holding capacity of those soils. They need to know more about the movements of water in soil. They need to know more about the quantity of water required to grow certain crops. They need to know the evil results following the application of too much water to land. In fact, generally speaking, the men who irrigate on this continent need to know considerably more about their business.

The average irrigationist is extremely selfish. He cannot bear to see water that he is entitled to running past his delivery gate. Rather than see a neighbour get the use of water to which he is entitled, he will flood it on to his own land, even though its application will injure his crop and waterlog his soil. He will run this water on to his land regardless of the disastrous consequences that are sure to follow, and the net result of this ignorance on the part of those who are placed on irrigation schemes to open them up, and even of those who have been practising irrigation for some considerable time, simply means that some irrigation projects do not get a chance. The farmer who floods his crops and land is discouraged, the operators are discouraged, and it frequently takes years to overcome this difficulty and correct the mistakes.

Now, as the irrigated lands form a considerable part of the arable area of Alberta, and consequently has a very great economic and commercial value as far as the province is concerned, the agricultural schools are going to endeavour to do their share in the educational work to be carried on for the settlers who shall occupy these irrigable areas.

In two of the agricultural schools which are being established in the province, courses relating to irrigation matters will be given. The large irrigated district lying in southern Alberta comes under the area covered by the Claresholm Agricultural School, and the problems of the south will be taken up there. The immense Canadian Pacific Railway irrigation project lying east of Calgary comes under the area covered by the Olds Agricultural School, and the irrigation course as given will deal directly with the problems as found there, the purpose being to give such assistance as will be most helpful to the settlers. In this connection, it is the purpose to make a thorough study of the various soils of the province, and further to make a thorough study of the various methods of cultivating the various soils.

In addition to this, a study will be made of the various ditch systems and methods of applying water, with particular reference to the judicious and careful application of water. Now, in the study of the cultivation necessary for the soils of this province, we believe that we can bring out and emphasize a point that is being sadly neglected at the present time by the man on the non-irrigable land in the province, and it is a point that is being sadly neglected by the man on the irrigable land, and that is, the matter of cultivation.

The farmers of western Canada do not cultivate enough. In the first place, nine out of ten men do not plough deep enough and the result is that nine out of ten men do not make proper seed beds for the growing of their crops. Providence, through the soils of western Canada and through the frequent and seasonable rains, has been kind to the West. Many a man has prospects of a bountiful crop, but he does not deserve it. If crops came directly in proportion to the effort of the individual and the thoroughness of his cultivation work, his returns this year would be small.

The man on the non-irrigable land wants to disc his crop in on last year's stubble. The man on the irrigable land is willing to do the same thing and imagines that all that is necessary is to apply water in sufficient quantities to reap an abundant harvest. It has been left for the man on the dry land to teach both the irrigationist and the semi-arid farmer many things pertaining to the proper handling of our soils, and indeed the use of irrigation water. The dry land farmer has developed his business through a system of thorough cultivation, and if the irrigationist and the semi-arid farmer would succeed in their line of endeavour, they must practise the same thorough cultivation. Mr. I. D. O'Donnell, of Billings, Montana, a man who grows large quantities of alfalfa and who feeds a large number of stock every year, in discussing the use of irrigation water, made a statement somewhat like this: 'In the early stage of our irrigation project in the Yellowstone Valley, I used to irrigate once or twice per season and cultivate once. Now,' he says, 'I cultivate two or three times and irrigate once, and that as little as possible.' That saying covers the whole subject in a nutshell. We in the West must cultivate more and irrigate just as little as possible, that is, never place upon the soil more water than the crop actually needs for proper maturity. It is not the large quantity of water that produces the maximum crop;

it is the smallest possible quantity of water properly conserved by cultivation and made to perform its full duty that produces maximum returns and preserves a sane system of agriculture that may be carried on indefinitely.

Now, may I discuss for a few minutes, the various ways by which we, in the schools of Alberta, may assist the irrigationist on the land.

First. By a thorough study of soils.—In this, we may look into the various classes of soil, their texture, their water-holding capacity, the possibility of percolation and seepage, the effect of sun heat in evaporation, &c., &c. Thus may we have a sane idea of irrigation water and its application.

Second. We shall study the growth of such crops as alfalfa, roots, summer pastures, timothy meadows and grain crops. Right here, may I mention that every indication points to the fact that on our irrigated area in this province we will be able to grow alfalfa successfully, and if the irrigation projects of Alberta have done nothing more than enable us to grow alfalfa successfully, they have amply repaid every expense in their construction, because we all know that this is the greatest of all fodder crops.

Third. We may discuss the possibilities of diverting any number of the thousands of small streams in this province, so that a continuous stream of water may pass through a number of adjoining farms and thus give pure drinking water for stock at all times, as well as water for crops and meadows.

Fourth. We shall take up in our carpentry department, the making of all kinds of useful equipment for the farm. As far as the irrigationist is concerned, this will include the making of flumes, gates, small bridges, &c., and in the making of these things the students receive a very complete training in the handling of farm tools.

Fifth. Of course, the best education possible is where the student may see a farm carried on successfully under irrigation. Now, as our courses run for six months in the winter, it is impossible for us to get this phase of the work, but it is our intention to keep closely in touch with the large men of this province who are concerned in the construction of our large irrigation projects. We will keep in touch with the Dominion Experimental Farm, where successful irrigation tests are being conducted, and we will as far as possible keep in touch with farmers who are successful in this line of endeavour. In short, we hope to make these schools of assistance, not fancied, but real practical assistance to the boys who may come to us from the irrigated districts. This work will not be confined to the boys from these districts alone, but will be given generally among other things to our students, because our idea is that a well rounded out education covering all of the phases of the agricultural life in this province will be the very best that we can possibly give to the students who attend our agricultural schools. (Applause.)

CHAIRMAN.—The paper is open for discussion. I may say that the Committee on Resolutions is not prepared to report at present, but will report to-morrow forenoon. The committee will meet again at the close of this meeting and any additional resolutions should be handed in before then.

MR. LAWRENCE.—Mr. President and gentlemen, it has been a source of great regret to me for the last two days that the Agricultural Department of British Columbia has not been here in force to support you and to learn the valuable lessons

which have been given since this convention opened. I refer more especially to what we have just heard. It is perhaps a matter of satisfaction to you that they were not here because had they been, I feel sure they would have hindered Professor Elliott. I should imagine that whether you were willing to let him go or not they would have taken him, lock, stock and barrel, to British Columbia and given him charge of the work he has just described. (Applause.) It is the very thing we want, the kind of instruction we need. I regret that my boys are all grown up and cannot take such a course as the Professor has outlined, and I also regret that my friend, Mr. Brown here, President of our Agricultural Association, has got all girls instead of boys. (Laughter.) This practical work in interesting the rising generation in agricultural matters is what I have been dreaming about and hoping for during the last thirty or forty years of my life. I hope to see the work established in British Columbia, where I have been nine years.

There is a question I would like to ask. He said that irrigated lands can be reckoned upon to produce three times as much as under dry-farming methods. Well now, this morning we were at the Demonstration Farm and saw some very fine fields of barley, lots of wheat and alfalfa that had been grown above the ditch and had no irrigation, and in British Columbia we have hundreds of thousands of acres in the same position. Would he say that if there had been water put upon that land we saw this morning there would have been three times as much grain as is now growing there? That is the question, sir, and I would like you to explain why there would be three times as much.

Professor ELLIOTT.—I am afraid the gentleman has misunderstood my statement. I said ordinarily speaking, irrigated land has a value of perhaps two to three times as much as non-irrigable lands. If the latter had a value of \$25 per acre, the irrigated land in any district where alfalfa might be produced has a normal value of perhaps \$75 to \$80 per acre. I would not like to contradict the statement either that it will not produce three times as much because when you can grow six tons per acre of alfalfa it is getting pretty profitable.

Mr. CURRY.—Give us the reason why.

Professor ELLIOTT.—Why, because we have a lot of land here that can be bought at \$25 an acre but you could probably not produce more than two tons per acre of alfalfa on it. Of course, there are localities where the rainfall is heavier and where the yield would consequently be heavier, but generally speaking, on non-irrigated lands we cut alfalfa but once.

A DELEGATE.—I would like to hear from Mr. Fairfield on that.

Mr. FAIRFIELD.—There is one point that affects that materially and that is the fact that we cannot carry on any kind of dry farming without introducing summer fallow, and if we introduce that it means we have one year in two or three that the land is not producing anything. Then if we take the average results from that and compare them with irrigated land on which a rational rotation is carried out—and on irrigated land we have no place for summer fallow—then your yields will be increased. I had rather not say how much, but it will be increased on irrigated land because you have loss of use in the one case and not in the other.

Mr. CURRY.—Is it not because it does not cost but little more to cultivate it so that it will produce six tons to the acre than it will to cultivate an acre that will only produce one or two?

Mr. FAIRFIELD.—Yes, that is so.

Alderman FROST.—In saying that I represent, I understand, that much-criticized body, a board of city aldermen, I felt it my duty to extend the greetings of the city of Calgary to this association. I wish to congratulate Professor Elliott on the introduction to us in a small way, of the curriculum he has framed for the education of the young farmer. I was educated in the home of manual training in the Dominion. I think it was Woodstock College that introduced manual training. The labour organizations showed great resentment to it. They said if we undertook to teach it, we would destroy established channels of work. Therefore several of them watched the effect of the course and wherein the young man did not need to make his own barn or shoe his own horse, or even repair his own wagons, he was in a position to see that the men he hired to do it did it right. (Applause.) I think he should know that, and do it himself if possible. With reference to the educational feature as to the use of water, I was raised in the fen counties of England. England is wonderfully irrigated by nature, in fact too much so, and the farmers are learning to undo what nature was overdoing, through the science of under-draining, and I have learned to look upon land as a living organism, fertilized by food and water, and that many of the crops if they did not take their food properly, died of congestion or possibly even double pneumonia. (Laughter.) I am very pleased to be here, and can say that the city of Calgary wishes you success in your work.

Mr. DUFRESNE.—I would like to ask Professor Elliott what is the area under irrigation in Alberta?

Professor ELLIOTT.—Approximately one and a half million acres. That is not completely covered by water, but includes areas covered and in process of construction.

Mr. JENNINGS.—The Professor stated that there were some hopeless failures due to poor selection of settlers in the irrigation block. I agree with him that the selection of settlers from irrigation countries is an advantage but not a necessity, and the failures he refers to are probably on the irrigation block of the Canadian Pacific Railway. Now, I don't consider it altogether fair to make such a sweeping statement for the reason that some of those men who came here were not familiar with the conditions of the country, exactly the same as everyone else who went into that block. Even the railway officials themselves did not know the conditions of soil and climate, and with regard to the men that made failures and pulled out, it does not seem to me that they would have wasted all their money and energy there if it could have been avoided. The fact remains early in the history of that block, that even the demonstration farm people themselves did not know whether alfalfa would grow. First of all, spring wheat was advised, then winter wheat, then sugar beets and now alfalfa is all the rage. I think the early settlers were a very good type of men, and if they could have hung on they would have been the very best settlers the country could have had.

Professor ELLIOTT.—May I state that I had no reference whatever to irrigation projects in this country. My statement was that all over this continent, including my experience of ten years in Montana, much longer than in western Canada, I had noticed such failures. Irrigation projects are expensive, and sometimes it is due to over anxiety of the promoters to get the settlers on the land as early as possible.

Mr. JENNINGS.—The point was the selection of settlers. The lack of information was my point.

Mr. PORTER.—May I emphasize the question of former experience? Most men before they come to an irrigated section have a rather ideal picture in their minds as to the ease with which a living can be made. Very often the promoter is responsible for painting that ideal picture, and the settler imagines that by raising the head gate with some mysterious motion the water will flow over the land and he will have an abundant crop without effort. At least fifty per cent of the people who come from the East, come with that mistaken idea. As a matter of fact, it takes more labour, more industry, more thought and more intelligence to make a success on an irrigated farm than to make a success in the rain belt. The returns are greater but it is necessary to put brains in with the labour, and I think the matter of that mistaken idea of the ease of making a living is very largely responsible for the struggle they have to go through in the first three to five years. We find that in that time the settlers go through a sifting process and a number become discouraged because they do not find conditions as easy as they anticipated. They have small capital resources, they have not the necessary farming equipment and they are not able to carry on their farming with the best results. Those who have the grit and determination to stay with it for at least five years almost without exception succeed. Experience in irrigation is very helpful, even if conditions are new. A man from any section coming to our country will find new conditions, but he knows what irrigation means and knows the labour necessary to go with it, and he does not come here with the mistaken idea that it is a snap. (Applause.)

Mr. REDDY.—I would like to divert the train of thought, and would like to say that Mr. Ellison of British Columbia was to have been here, and anyone who knows Mr. Ellison will admit the fact that his absence is a guarantee he has some good excuse for being absent. I have been connected with the department for only two or three months and I am not familiar with irrigation work. For that reason, I have not identified myself very intimately with these proceedings, but I think that before very long Mr. Lawrence may have occasion to feel that what he has said regarding our department was a little bit premature.

Mr. LAWRENCE.—Mr. President, of course I must take that correction in the sense it is meant. At the same time, I cannot get rid of the fact that on that platform where British Columbia should have been represented there are those empty chairs. If anyone connected with the department is here, I think they should have been more in evidence and given the rank and file of British Columbia some little confidence. We would like to feel that the leaders are very much in evidence. That has been noticeably absent on this occasion.

Putting that aside, I want to ask Professor Elliott another question. He seems to know pretty well everything about irrigation. Has he given any attention to the

drainage of cities and towns and using that for irrigation instead of allowing it to be wasted? If he knows how it is done; what the results are; whether they are satisfactory or unsatisfactory; whether they are economical or expensive. I am sure that the information would be of value to many more besides myself.

Professor ELLIOTT.—May I correct the statement that has just been made and say that my knowledge of irrigation is very small indeed. I have picked up a few things, but my sum total of the knowledge of irrigation is comparatively small.

Referring to the second statement, the only place I know of has been Chicago. I remember passing through the district where they had trenches three or four feet deep into which the sewage was drained and then the trenches were filled in, but I cannot say as to the feasibility.

Mr. MOODIE.—I would like to say, for Mr. Lawrence's information, that if he will drop into Kelowna on the occasion of the convention in Penticton next year (laughter) we will hope to show him that Kelowna is following in the footsteps of Chicago. A sewage farm is in progress there, and I hope by the date of the convention that something will be ready for Mr. Lawrence to see by which Kamloops could profit. (Laughter and applause.)

Mr. HUCKVALE.—I would like to mention for the information of some of the gentlemen here that several towns in England and on the continent dispose of their sewage by way of fertilizing and irrigating farms and they are very successful, both from an economic and hygienic point of view. It seems to me that with the small precipitation here and the many new towns springing up, a demonstration along these lines would be a most useful adjunct to the demonstration farms already inaugurated by your government and others. (Hear, hear.)

Alderman FROST.—I would like to ask what would be the alternative system in Alberta, if you had a system of that kind in the winter? In the Old Country it could be handled all the year round.

Mr. HUCKVALE.—That, of course, is a question that would have to be solved by experiment and by gathering experience and data from other places, but as far as England is concerned there have been winters there where severe frost has occurred for a very considerable period. I remember as a boy that we had pretty good skating one winter for about three months. Of course, in this country we have a good deal more winter, but if a city in England can maintain a sewage farm under those conditions, I think that the difficulty might be solved here.

Mr. PEARCE.—I think the question raised is one of the most important questions that faces civilization to-day, and that is the waste in the disposal of sewage. All one has to consider is China, which has kept up the fertility of the soil for centuries and does not waste any sewage. It is producing to-day more per acre than it ever did. There is no waste there. I think our scientific men could give a great financial return to the country if they could solve this problem. In New York, millions of tons of the most valuable fertilizer are discharged into the sea to the detriment of the harbour and at the same time, the United States as a whole, is spending millions of dollars in importing fertilizer. There is something wrong in our system of the disposal of sewage.

Mr. HOUSTON.—There are several smaller towns in the States that are disposing of sewage by the use of septic tanks or something similar, which change the solid matter to liquid form, and then this is discharged underground in drains and carried over farms and disposed of that way. Whether it is profitable commercially or not, I do not know.

Mr. MOODIE.—In connection with the plant at Kelowna, I stand corrected. It is not the purpose of Kelowna to establish a sewage farm, but I find it is simply to be a sewage disposal plant.

Mr. LAWRENCE.—Then there will be no need of my going there, sir. (Laughter.) That must be one of those things we have had at Kamloops for the last twenty years.

CHAIRMAN.—I presume the discussion is practically ended. I am asked to announce that the Committee on Credentials will meet in this hall to-morrow morning at 9.15. I understand at the conclusion of this meeting there is a photographer at the door who wants to get a picture of the members of the Cypress Hills Water Users' Association, and I would ask those delegates to kindly accommodate this photographer. He is willing to take a chance on his machine. (Laughter.) I would also like to repeat the announcement concerning the illustrated lecture this evening. The convention is now adjourned to meet at 9.30 a.m. to-morrow.

Mr. Armstrong delivered his illustrated lecture in the evening. The theatre was filled to its capacity (400) and the lecture was greatly appreciated.

THURSDAY MORNING SESSION.

The convention reassembled on Thursday morning, August 7, at 9.30 a.m.

CHAIRMAN.—Ladies and gentlemen, we are ready to resume our programme again. There are some delegates who wanted to leave this afternoon, and a request has been made that the place of holding the next meeting should be fixed and the officers for next year elected at the forenoon session. It is on the programme for this afternoon and, of course, if any delegates object, we will not hold it until then. But if the delegates are all agreed then we will fix the next place of meeting and elect the officers immediately before adjourning for lunch. Are the delegates agreed?

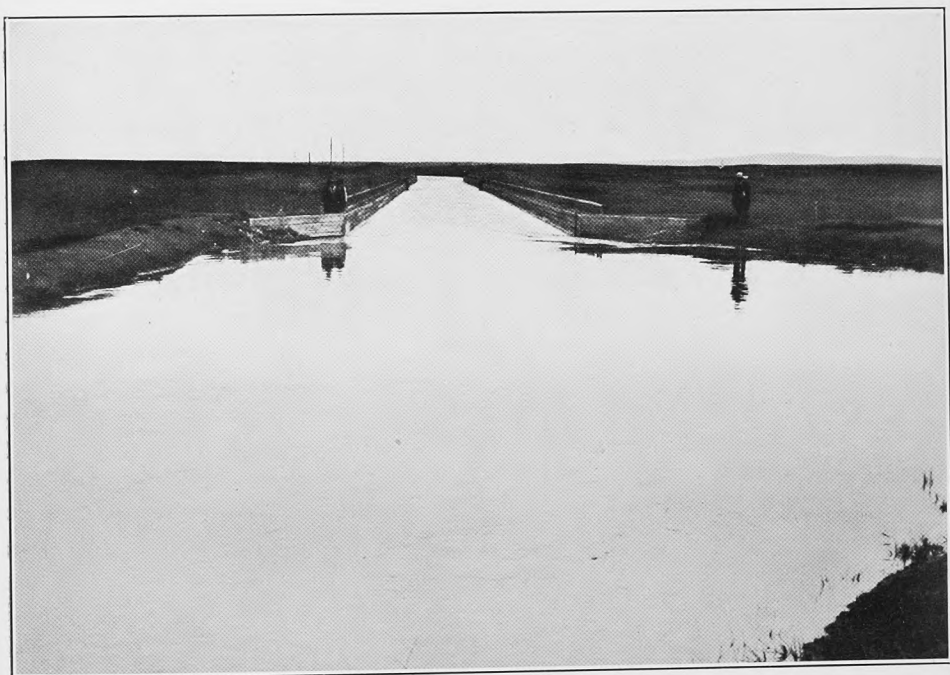
VOICES.—Yes.

CHAIRMAN.—I understand that Mr. R. H. Campbell, Dominion Director of Forestry, is present. Mr. Campbell was on the programme to speak on the opening day but could not get here before. We would like a few remarks from him.

Mr. R. H. CAMPBELL.—Mr. Chairman, ladies and gentlemen, I did not expect to be called on quite so suddenly. I thought that perhaps I might speak after Mr. Miller had submitted his paper on the Rocky Mountains Forest Reserve. I have attended almost all of the conventions of the Western Canada Irrigation Association, and I have had something to do with the administration of the water laws of the Dominion, as well as with forestry work; and just a day or two ago, in the



Irrigation creates wealth from Water, Sunshine and Soil.



Irrigation Canal at Lethbridge.

northern end of the province, I was wishing very heartily for a good supply of water. I happened to run into Athabaska Landing the other day, and had a pretty hot time.

CHAIRMAN.—Election or fire?

Mr. CAMPBELL.—Fire.* The water supply question and the forestry question are pretty closely allied and the connection between them is not anywhere more strikingly illustrated than in this province, in connection with the streams that flow from the mountains and the Cypress Hills. It is a matter that has been considered by the public in general and by the government for quite a number of years, and we have gradually been appreciating the importance both of the protection of the timber and of the water supply, and have been taking measures to that end. Previous to 1900, Mr. Stewart was appointed Superintendent of Forestry for the Dominion. The Dominion Government, which was administering the timber, had not paid much attention to its protection, but fires were devastating it everywhere almost every year. At that time, the Forestry Branch was organized and from that time matters have gone on developing.

In the first place, speaking of one of the smaller matters, inasmuch as the particular parts of it are smaller, the Division of Tree Planting was established, with headquarters at Indian Head, from which we have distributed trees all over the prairies, and I hardly need say very much as to the good results from the work. Trees are being grown successfully on farms all over the prairie country and result steadily in the improvement of the homes and make life on the prairie much more attractive. We are extending that work, inasmuch as the demand is steadily increasing, and we have added to the nursery at Indian Head another half-section, which will probably enable us to double our output; so instead of being able to distribute three million trees annually as at present, we can at least double that output and perhaps considerably more.

As far as the forestry work itself is concerned, the Fire Ranging Service was organized almost immediately after the Forestry Branch, and very shortly thereafter certain unsuitable areas for agriculture were set apart for the forest service. Mr. Millar will tell you something about the Rocky Mountains Forest Reserve and the plans proposed for its protection and management, but I think we can claim that the development of the protective work has grown as reasonably good as could be expected in the time. In the first place, the public generally, any more than the government, does not, I think, realize the great destruction that takes place as the result of fires. Anyone, however, who has travelled through forest districts can realize very quickly the immense destruction caused by fires in past years and the difficulty and time it will take to repair that damage and bring the forests into good condition again, as they might be and probably will be, if the forests are properly protected. But the conditions to hand must be considered in excuse for the laxness which undoubtedly occurred before. Since that time I think the work has been pushed as vigorously and actively as it could possibly be. The Canadian Forestry Association was formed at that time and has done a great deal to mould public opinion on the subject and assist the government in the development of its work. The problem has been studied as closely as it has been possible to do. We have pub-

* The hotel at Athabaska Landing was burned while Mr. Campbell was there.

lished a number of bulletins giving information in regard to our forest resources and products, and such other information as we have been able to gather with some degree of accuracy. We have not attempted, except in a very general way, to make an estimate of what the forest resources actually are in this great western country, inasmuch as the information is inaccessible, so that any statement made is merely a matter of estimate and depends greatly on each man's idiosyncrasy or point of view.

We have been making further development of the work in studying the wood-working industries of the country generally. We have begun that work in the eastern provinces. We have completed our investigation in Ontario, almost completed it in the Maritime provinces, and our intention is to make a study of the wood-working industries in the western provinces, with the object of pointing out industries that can be established with wood as their basis. Only within the present year, the government has authorized the appointment of a man to investigate questions relating to the uses of wood, the prevention of waste and all other matters that will mean the better utilization of the products of the forest. So that I think on the whole the work has been making a steady and a careful advance. When Mr. Stewart first assumed charge of the Forestry Branch, the government with much hesitation and difficulty gave an appropriation of \$10,000 to carry on the work, and this last year the government appropriated \$540,000 for the same work, involving the work of fire patrol, the organization of the Forestry Service on a permanent basis, with permanent rangers and other improvements which are necessary for effective protection, for the development of the tree planting work and the special inspection work.

In the administration of the water resources, I don't think I need say very much in regard to what has been done. The law was established on a good basis practically from the start and the development has been fairly steady. Especially in the last few years the work of the Irrigation Branch of the department has been on a much more thorough basis. It has not by any means received the support it should have as yet, nor has it been organized on as broad a basis as it should, but in its work of stream measurements, ascertaining what supplies are available, it has made very decided forward steps, and in the general management of its work it has certainly been well developed. I have gone off the water wagon in that respect myself, inasmuch as I have nothing further to do now with the actual administration of the irrigation work, but the work is in good hands, and I may say that I pride myself a little on the fact that before it passed out of my hands, I had been able to see it reach a point where it was going to make steady development and to see it in hands that could carry it on as it should be.

I hope that the irrigationists generally, though interested in the water supply, will recognize the very close connection between forestry work and irrigation work, and that recognizing that fact we will have their support in the measures we are taking to attempt to protect the watersheds by preserving the forests on them. (Applause.)

CHAIRMAN.—The convention will now be addressed by Mr. Millar, District Inspector of Forest Reserves, on the subject of 'The Rocky Mountains Forest Reserve.'

MR. LAWRENCE.—May I ask if Mr. Campbell would tell us something about fire preservation in British Columbia, if that is in his jurisdiction?

Mr. CAMPBELL.—Of course, the Dominion Government has only jurisdiction in regard to fire prevention in British Columbia in the Railway Belt: that is, the forty mile belt along the main line of the Canadian Pacific Railway and in the Peace River block of 3,000,000 acres on the headwaters of the Peace river.

The work in the Railway Belt has been organized first on the basis of protection. The timber is not actually in reservation. The Railway Belt has been divided into twenty-three fire ranging districts, with a chief fire ranger in charge, and each has about twenty rangers under him who have districts assigned them to patrol. Along the railway lines there are special patrols which are established by the railways themselves under the instructions of the Dominion Railway Commission. The patrols by the railways are under inspection by officers of our department, who are also officers of the Railway Commission. These officers inspect the lines to see that the rights of way are properly cleared up; that the patrol is kept on and efficiently equipped as required by regulations. There has been a decided improvement in the province of British Columbia along the railways. They have shown a very deep interest in the matter themselves, and besides clearing the rights of way and furnishing the patrol, the Canadian Pacific Railway has equipped a very large number of its locomotives with apparatus for burning oil instead of coal as fuel, and that has greatly minimized the danger. In the dry part of the Railway Belt almost all of the non-agricultural land has been taken into the forest reserve and will be kept permanently in timber, and we are at the present time working out a permanent organization. We have an inspector, with headquarters in Kamloops, and foresters under him, and we are doing considerable work during the present year in the way of improving the trails, making some roads and building cabins for the rangers, so that they can live right in the districts they have to protect. We are working to get the whole matter organized on permanent lines. (Applause.)

Mr. LAWRENCE.—Do I understand that your jurisdiction does not extend outside of the Railway Belt?

Mr. CAMPBELL.—The rest of the province is entirely under the administration of the Provincial Forest Service.

Mr. LAWRENCE.—Are any steps being taken to disseminate information to new settlers and some very careless old settlers whose only idea is that if the land is cleared by fire, so much the better? I speak as a settler of nine years' standing myself, and I assure you I have received no information on the subject although I am deeply interested in it.

Mr. CAMPBELL.—Of course, I cannot speak as to what is being done outside the Railway Belt.

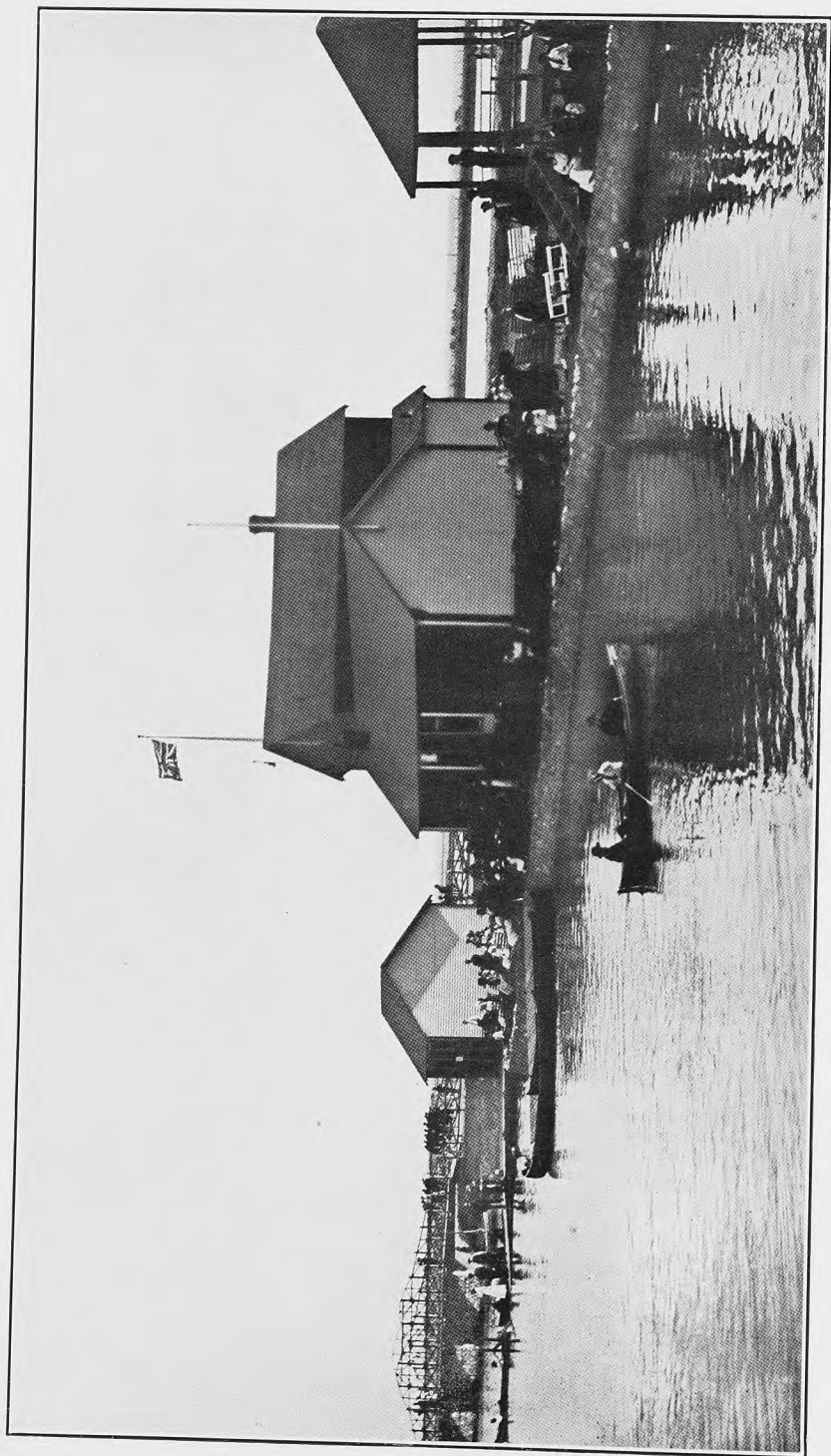
Mr. LAWRENCE.—I am speaking of inside the Railway Belt.

Mr. CAMPBELL.—I think that the Forest Service of the Provincial Government is taking hold of the matter pretty vigorously and will overtake the work as rapidly as it can. The Protective Service there has only been organized within the last three years and it will take a little time to get matters well in hand. Inside the Railway Belt, we have had rangers patrolling there now for many years and each ranger is

supposed—and I think they do it fairly well—to act not only as a sort of policeman to look after fire when it occurs, but is also expected to act as a sort of educative force in his district. His instructions are to visit people in the district as frequently as possible, to explain the dangers of fire, the best measures for prevention, should it occur, and to urge them as far as possible to comply with the regulations and take all precautions to prevent fire. There is a provision in the Fire Act of the Province of British Columbia which perhaps other provinces could consider the advisability of adopting. It provides that no fire for clearing land shall be set out during the danger period without a permit from the fire ranger, and it is his duty before issuing the permit to be sure that the time is not such a generally dry one that it would be absolutely dangerous to set out a fire, and if that is not the case, that the man who wishes to set out the fire has taken proper precautions. That system has, I think, been carried out with a fair degree of efficiency. My information is that since that clause was put into the Act and since the fire rangers have begun to take over the matter of enforcing it, conditions have distinctly improved. Of course, there is always room for improvement.

Mr. LAWRENCE.—Well, sir, I would draw your attention to conditions in that part of the Kamloops district where I am located. I do know, quite by accident, that you have a fire ranger, or superintendent, or whatever you call him, there, and that men are appointed to patrol the forests; but where they are, I do not know, nor how to get at them. As far as the origin of fires is concerned, the Canadian Pacific Railway are not to blame for them for they have occurred many miles away, and whatever else they may be guilty of, they are certainly not responsible for the fires. By the head of the North river there is a valley three hundred miles long, splendidly timbered. Settlers are going up along the east bank for a hundred or a hundred and fifty miles up the river. The majority of them are inveterate smokers and are apt to start some dangerous fires, and if a big fire started there I should not know where to find the patrols. The danger is as great to-day as ever. I had the privilege of writing you, sir, two or three years ago, on that very subject, and I endeavoured to point out that the only adequate protection from fire in that large, scattered district would be by means of the telephone. I say with all deference, that the present condition of affairs is nearly, if not quite, as lamentable as far as protection is concerned as it was three or four years ago. In my time a tremendous amount of valuable timber has been destroyed. So little notice is taken of big fires in that section that no mention is made of them in the local papers; we are so used to that state of things. All we knew about it was that bridges were burned out and that the settlers who were in town for supplies were shut out from home, and those inside could not get out. There was a twenty-mile fire there in which an enormous quantity of valuable timber was destroyed, and no notice was taken of it. As a matter of fact, some of the settlers say the more fire there is the better for the country; the land has to be cleared and it is not so expensive that way. I have not exaggerated. If you were to take a map and study the district that has been burned out, you would come to the conclusion that the present provision against fire is totally inadequate.

CHAIRMAN.—We will now call upon Mr. Millar.



A scene on Henderson Lake, Lethbridge, Alberta.

THE ROCKY MOUNTAINS FOREST RESERVE.

Mr. W. N. MILLAR.—Mr. President, ladies and gentlemen, in requesting me to address you on the subject of the Rocky Mountains Forest Reserve, your secretary has struck at the fountain-head of irrigation in the provinces of Alberta and Saskatchewan, for the reason that the Rocky Mountains Forest Reserve contains within its boundaries the sources of practically every important stream in use for irrigation in these provinces except the St. Mary and the Milk rivers, and the latter are protected by a similar reservation in the Glacier National Park in the State of Montana.

The paramount interest of this association in the Rocky Mountains Forest Reserve lies in its value to the irrigationist as a conservator of water, but many here present are also interested in this Reserve as a source of timber supply and as a public range for stock during the summer months.

LOCATION, AREA AND BOUNDARY OF THE ROCKY MOUNTAINS RESERVE.

Roughly speaking, the Rocky Mountains Forest Reserve comprises the east slope of the Rockies from the international boundary north to township 62, range 13, west of the 6th meridian. This Reserve was established by order in council dated May 13, 1910; extended and made permanent by Act of Parliament, dated May 19, 1911; and again further extended by Act of Parliament dated June 6, 1913. It has an area of approximately twelve million acres or 18,750 square miles.

VALUE OF THE ROCKY MOUNTAINS RESERVE AS A CONSERVATOR OF WATER.

To appreciate the value of the Rocky Mountains Forest Reserve as a conservator of water and to realize to the full its relation to the irrigation interests of the prairie provinces, one need only glance at the map and note the streams that head in this Reserve. Mentioning only the larger and more important rivers, we find included among them the Waterton, the Old Man, the Bow and the Red Deer rivers, all branches of the South Saskatchewan; the North Saskatchewan and its two main tributaries, the Clearwater and the Brazeau; farther north the Athabaska, with its principal tributaries the Rocky, the Stony, the Maligne, the Pembina, and the McLeod, and still farther north the Little Smoky, the Simonette, the Great Smoky and the Wapiti combining and flowing into the Peace river. The first group, namely, the Waterton, Old Man, Bow and Red Deer, find their chief usefulness as a source of water for irrigation purposes, and the largest irrigation works in the Dominion are found upon these watersheds. The other groups are mainly useful at the present time as avenues of commerce, many of them being navigable for large steamers and some, such as the North Saskatchewan, being susceptible of improvements which are likely to make them of vast importance in the commerce of western Canada. All of these streams have minor uses for domestic and municipal water supply and for the generation of electric energy. For instance the great prairie cities of Lethbridge, Calgary and Edmonton all draw their water supply from rivers that head in the Rocky Mountains Forest Reserve. The city of Calgary, which draws its main supply

from the Elbow river, has a special interest in the Rocky Mountains Forest Reserve since the purity of this water supply depends very largely upon the protection and administration of the Elbow watershed as carried out by the Dominion Forestry Branch.

For all of these uses regularity of flow in the rivers is a prime essential. In some perhaps it is more important than in others, but in all cases it is highly desirable that excessive fluctuation in volume be avoided, while as all of these uses involve the construction of costly dams and other development works, it is extremely important that the deposition of silt by flood waters be avoided as much as possible.

DO FORESTS CONSERVE WATER?

The question of whether forests actually conserve water or not is one that has been very extensively discussed in the United States. The opponents of this doctrine have even gone to the extent of arguing that forests actually hasten the run-off of precipitation by increasing the rapidity with which the snow disappears, and have advanced in support of this remarkable theory, lines of argument which are refuted by every-day facts of known experience. It is very generally recognized both by those inside the departments and by a large part of the public, that there were many involved and obscure reasons for these attacks upon a doctrine of such widespread general acceptance, but so plausible were the arguments advanced and so skilfully were statistics handled to seemingly back up these arguments, it was thought necessary by the United States Forest Service and the United States Geological Survey to conduct a series of very extensive and elaborate experiments, some of which are still going on, to prove by indisputable evidence what most persons know to be a fact from practical every-day experience and observation, namely, that forests are a most potent aid in regulating the run-off of surface water, in delaying the melting of snow and in binding the surface soils so as to prevent soil erosion on mountain slopes.

Many of these experiments have been completed and the results are sufficiently conclusive to refute the arguments of those who hold that forests are not of any importance in regulating the flow of streams.

Granting, therefore, that we are agreed that a forest cover at stream sources is essential for the preservation of that regularity of stream flow which is of such great importance to the commercial and industrial utilization of our rivers, what dangers threaten this cover in the Rocky mountains and what means are being taken to protect it? We find that there are three principal agencies of destruction. The first and by far the most important is forest fires. Of minor importance but still subjects for earnest consideration, are destructive methods of logging and unregulated grazing of live stock.

Before taking up the consideration of fire protection as it is being developed on the Rocky mountains and as we hope to improve it in the future, it would be well to glance at the forest conditions as they now exist on the east slopes and consider the effect of past neglect upon stream flow. It is a well known fact that practically all of the streams flowing out of the Rocky mountains are subject to a very marked seasonal fluctuation. When we find the Bow river, for instance varying from a

minimum flow of 600 cubic feet per second to a maximum of 60,000 cubic feet per second it is evident that greater regularity in stream flow than we now have would be highly desirable, and if a forest cover has the influence upon surface run-off which we believe it to have, there must be some defect in the existing cover which permits such variations as are noted upon most of the streams in Alberta. It takes but little observation of the east slope forests to furnish an adequate explanation of the existing conditions. We find that while there is evidence that fires have occurred on the east slope from time immemorial, nevertheless there has been enormous and wholly unprecedented forest destruction by fires within the last half century. We find that roughly speaking at least ninety per cent of the forests on the east slope are not one hundred years of age and that more striking still, probably seventy-five per cent are not fifty years of age. We find that the earliest explorers reported heavy stands of timber over hundreds of miles of country which is now practically denuded. We find that every evidence points to a widespread destruction of the forests on the east slope within the period of the last fifty years during which travel in these mountains has been a factor of considerable importance.

We further find from a study of statistics on the causes of forest fires that in the region represented by the east slope, lightning as a cause of these fires is relatively unimportant and that human agencies are almost exclusively responsible.

That the widespread fires which have occurred in the east slope forests have not resulted in extensive deforestation is due wholly to the vigour with which lodgepole pine, the principal species on the east slope, reproduces after a forest fire. Had these mountain slopes been timbered with a species which did not have the reproductive powers of lodgepole pine, or had the soil been of such a nature as is found in the Laurentian region of Ontario, there can be no doubt that the mountains would be now as denuded of timber as is the region to the north of Lake Superior. It should be pointed out, however, that there is a very decided limit to the reproductive capacity of even such a species as lodgepole pine, and that if such stands are burned over before the young trees have come to cone-bearing age, it is found that the land ceases to bear trees and becomes covered with grass and low brush. This is the danger which is especially threatening in the Rocky mountains at the present time, because such a vast area of the Forest Reserve is now occupied by young lodgepole pine reproduction which has not yet attained the age when it will produce seed. It is, of course, unfortunate that fire protection on these mountains was not developed thirty or forty years ago, but on the other hand it may be considered a fortunate circumstance that we have been able to place the slope under administration and to get in some measure of protection ahead of the great development which is certain to take place in the mountains in the next ten years.

It must be realized that conditions as to fire danger on the east slope of the Rocky mountains in Canada have certain peculiarities which are not found farther south. In spite of the fact that the mountains of Montana, Wyoming and Colorado have been the scene of enormous mining activities since the early sixties, nevertheless the forests of these mountains have not suffered from fire in a way that is at all comparable with the damage that has been done on the east slope of the Canadian Rockies. This is not due to any greater precautions taken in the American Rockies nor to any difference in climatic conditions for, in fact, climatic conditions are if

anything more favourable to fire damage in the south than in the north, but is wholly due to the difference in the predominant species. We find in the Canadian Rockies that lodgepole pine and Englemann spruce are two species which constitute practically the entire forest. Both of these species have extremely thin bark and are readily destroyed by surface fire. Red fir with its thick fire-resisting bark occurs very sparingly, and yellow pine, which is equally fire-resisting, is not found at all. As we go farther south in the Rockies, we find the proportion of red fir and yellow pine constantly increasing. We find Englemann spruce confined almost exclusively to the highest elevation, where it does not form an important element in the commercial forest. This difference of species readily accounts for the more extensive damage from fires which we find has occurred in the Canadian Rockies.

METHODS OF PROTECTION.

In organizing for the protection of the Rocky Mountains Forest Reserve, we have first divided the entire Reserve into five subdivisions or forests, placing each under the control of a forest supervisor. These divisions run from a million to three million acres in area and are laid out on topographical lines so that they can be administered practically independent of each other. Each supervisor is given the necessary technical and clerical assistance, and has further subdivided the area under his charge into ranger districts which, while they vary considerably in area owing to a variety of reasons yet average about two hundred thousand acres each taking the Forest Reserve as a whole. These ranger districts are also bounded by mountain ranges or other topographic lines, and the ranger in charge of each is given entire responsibility for all lines of work in the district, not alone in fire protection but also the administration of timber, the construction of improvements and all other activities. Wherever it is possible to provide year-round work, which is true in more than half the districts, we are enabled to employ our men year long and thus secure not only a better type of ranger but make sure that our men are familiar with their districts, with the work which they are called upon to do, and with the routine procedure of the department. This organization, however, with its gradation of authority and distribution of responsibility and identification of officers with well defined areas of the Reserve, is obviously only a preliminary. There has within the last ten years, been a most marked improvement in methods of fire protection and in the results obtained. Several organizations, among which the most important are the United States Forest Service and the Western Forestry and Conservation Association, backed with ample funds and charged with the responsibility of protecting immense stands of timber, have given much time, attention and money to improving methods of fire protection, developing the lookout systems, perfecting improved apparatus and devising schemes for solving the fundamental problem in fire fighting, which is getting to fires the largest number of men in the shortest possible time. No longer is it necessary to depend upon mere patrol for purposes of fire protection. To provide really adequate protection in the Rocky Mountains Forest Reserve by a patrol alone, unassisted by an efficient organization or modern equipment for the location and reporting of fires and securing of assistance, would require a small army of men, certainly more than we have the funds to employ or

can well justify. By the use of modern methods of locating fires by triangulation from lookout peaks, of communication by telephone or wireless and of securing and despatching assistance according to pre-arranged fire plans which endeavour to provide for every possible emergency, it has been possible for those organizations which have given the most attention to this work to secure thoroughly adequate protection under most adverse conditions at a cost of from one to two cents per acre. In the matter of actual fire fighting there have not been any material improvements made. We still have to depend upon shovel, axe and grub hoe for the building of fire trails, and where the fire is not being fought directly we back-fire in the usual manner. However, there are quite a number of men working along the line of improved apparatus for fighting forest fires, and some has already been patented and placed upon the market.

It will be readily seen that the modern forest ranger has become a rather highly skilled and specialized employee and that he must have a special training even to handle the fire fighting work alone. When you consider the numerous other duties which devolve upon the district ranger in his administration of a forest reserve you will readily appreciate that we are very seriously handicapped at the outset both by a lack of trained men and a lack of facilities to provide this training. In order that we may remove the disabilities under which we are working at present, the Branch is advocating the selection of men by competitive examination, and subsequently training them in a special ranger school organized within the Branch and provided with instructors from among the employees of the Branch. At the present time, not having such improved facilities, we are doing the best we can to train the men within our own organization, but find that the press of routine administrative work makes progress extremely slow. We hope, however, to secure these improved facilities within a short time and to be in a position to guarantee full protection to stream sources as far as the fire menace is concerned.

DESTRUCTIVE LUMBERING.

A minor source of danger to the Rocky mountains forests at the heads of the important prairie rivers is destructive methods of lumbering. That this danger is not greater is due to the fact that forest fires have reduced the extent of merchantable timber in the mountains to such small areas that even were they all cut at once it is doubtful if this deforestation would have any marked effect except in a few local stream valleys. The greatest danger threatening from methods of logging employed upon Dominion lands lies in the fact that these logging operations are very widely scattered throughout the forest reserve, there being one or more in practically every important watershed, and that the slash which is accumulating upon these berths as logging continues from year to year acts as an ever-present menace to the surrounding young growth. With the increase of slash areas there is a growing danger of fires starting in this slash or spreading to it from adjacent lands, and as so frequently happens, growing to uncontrollable proportions because of the great accumulation of dry and inflammable material which slashed areas afford, and this danger in the Rocky mountains is constantly being augmented.

As regards the future of the Forest Reserve as a source of timber supply, it is extremely doubtful if after the present mature timber is removed the Reserve will be an important factor in the lumber supply of the prairie provinces for several generations. At the best it will be many years before the present young growth can attain sawlog size, and it is in fact doubtful if growth on the east slope is rapid enough to warrant any attempt to compete with the more favourable timber lands in British Columbia. The probable future function of the Rocky Mountains Reserve will be to serve local needs for low grade rough lumber manufactured by comparatively small outfits and for round products such as fence posts, fence poles, ties, cordwood and especially mine props. The production of mine props and mining timbers in general will be of extremely great importance because of the widespread distribution of coal throughout the Rocky Mountains Reserve and the probability that development will in future years take place wherever this coal occurs in commercial quantities. It is proposed in the regulations for the disposal of timber in this Reserve to rather discourage any attempt to manufacture Reserve products for export, but to encourage the utilization of its products in local mining development and by settlers and local residents.

It will be plainly evident, therefore, that in view of the forest conditions known to exist on the east slope and the ever threatening danger of total destruction by fire, that great as is this Reserve in area and in future possibilities, it will be some years before it will yield a considerable revenue and must for years be a source of great expense to the Dominion Government.

GRAZING RESOURCES OF THE ROCKY MOUNTAINS FOREST RESERVE.

I find that there is a very general misconception in regard to the extent and value of the grazing lands available within the Rocky Mountains Forest Reserve. It is pretty generally believed that there are large areas of good grazing land within this Reserve, but as a matter of fact the line between absolute timber land and grazing land south of the Bow river is very distinct, and the forest boundary has been established so that practically all of the foothill grazing lands lie outside the Reserve. Within the Reserve, however, there are numerous isolated valleys containing from a few hundred to a few thousand acres of grazing land which, while not very considerable in any one place yet amounts to a fair range in the aggregate. Much of this grazing land is due to the action of fire which has totally destroyed the forest cover so that the lands have reverted to grass and brush. The reproduction of timber on these lands is taking place in many sections and would be totally destroyed were grazing permitted without some form of regulation. Moreover, as the forest ranges become more fully stocked we would undoubtedly find that unregulated grazing was making serious inroads on the younger stands of reproduction which are already established. This would be especially true in the case of sheep and could not help but affect adversely the conservation of water by the mountain forests. What we need and plan to have in the Reserve is an extremely flexible system which will enable us to adapt our grazing to the primary objects of the Reserve, namely, water conservation and timber production. We are aided in the establishment of such a system by the fact that the grazing on the Forest Reserve is confined almost entirely

to three or four of the summer months, and that there is no possibility of establishing ranches that would do a year-long business within the Reserve.

In considering regulations for the grazing of live stock within the Forest Reserve, we have kept in mind three fundamental propositions: (1) that grazing is merely incidental and must be subordinate to timber production and water conservation; (2) that grazing is confined for climatic reasons to a very limited portion of the year, and (3) that the grazing lands within the Reserves are very restricted in area, badly scattered and are badly broken by areas of timber and brush land.

In view of these conditions we have come to the conclusion that a system of annual permits issued not for a particular area of land but for a specified number of head of stock would be most likely to accomplish the objects desired. We were also convinced that by arranging this system so that preferences in the granting of applications are determined not on a basis of priority of use or priority of application, but on a basis which will give the greatest opportunity for securing the benefits of the mountain range to the nearby resident rancher or farmer operating, as in the majority of cases, on a comparatively small scale, that we could thereby give material assistance of a practical character to encourage mixed farming. We believe that the greatest good will be accomplished by a system of regulations which will insure the distribution of this range among the greatest number of resident stock owners with a provision that no one will be required to limit his stock to a less number than is necessary to maintain an independent existence on a ranch or farm.

With these objects in view, therefore, we have devised regulations and submitted them for approval, and expect shortly to have the business on a much more satisfactory basis than it is at present.

The three principal lines of work, therefore, which are engaging the attention of the Forestry Branch on the Rocky Mountains Forest Reserve are: (1) fire protection, which involves the construction of a large amount of permanent improvement works and the selection, training and organization of an efficient personnel; (2) the application of conservative methods as opposed to destructive methods of lumbering in the mountain forests; and (3) the regulation of the grazing of live stock so as to serve the reasonable needs of the greatest number of local settlers and ranchers in an adequate manner. (Applause.)

CHAIRMAN.—As we started a little late with the programme, I think we will continue right on rather than have any discussion at the present time. We have had two or three speakers from outside our own country at this convention and we have been greatly interested in, and profited not a little from their addresses, and we are very glad to welcome to-day Professor R. H. Lyman, Professor of Engineering in the University of Utah, Salt Lake City. We hope at some future date, that this association will send representatives to meetings in their country to discuss questions of our own, and we believe that the exchange of ideas will profit both the people who live here and across the line. We have another object in getting some of these men to see our country: our ultimate object being to keep them and make Canadians of them. (Applause.) I don't know whether we will be able to keep the men at this convention or not, but we are sure that if they go home now they will never be quite satisfied until they come back again. I have very much pleasure in introducing Professor Lyman.

IRRIGATION PRACTICE IN UTAH.

Professor R. H. LYMAN.—Mr. Chairman, ladies and gentlemen, in Utah we are aiming to irrigate according to the best teachings of science and of practical experience. We are trying to keep records, to keep accounts, to learn from the experiences, the shortcomings and mistakes of the past, how best to irrigate in the present and in the future.

In these days the wise business man is not satisfied to take an inventory of his whole stock once each year, and to see then, and then only, whether or not his business is paying. He must know more frequently his financial condition; he gives his balance sheet a daily examination. Nor is he content to know that the business as a whole is making money; he insists on knowing what portion of the profit comes from each department. He develops the most profitable, and he lessens or eliminates those branches which prove to be but burdens. In like manner farmers and irrigators—it is our right, it is our duty, to derive from the land and water we possess the greatest possible profit. It has been shown in Utah by careful scientific investigation that the percentage of profit produced by the farm depends largely upon combining the water and the soil in proper proportions.

To illustrate this truth to you, and induce you to learn by careful record keeping what combination of soil and water is the most fortunate for your individual farm, and to induce you in your farming to make these combinations, and reap, as a consequence, the rich profits which will follow, is the prime purpose of this paper.

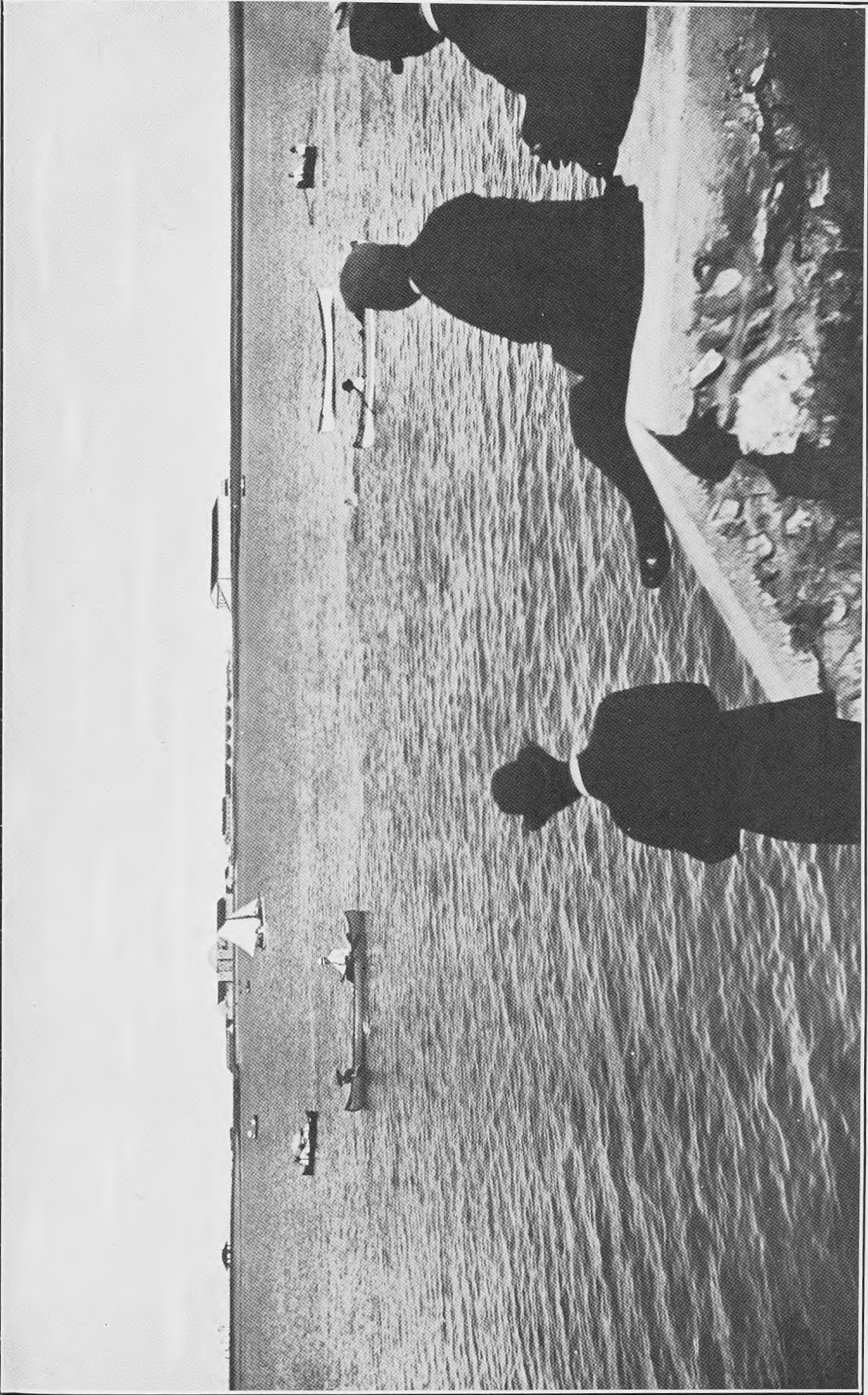
The wise contractor is not primarily concerned with the number of cubic yards of concrete put in place per day, nor with the number of cubic yards of earth which have been moved, nor the length of trench that has been dug when the sun goes down—when the day is gone he desires to know, he asks his foreman, ‘How much is the profit to-day?’ Nor does the answer to this question tell all he wishes to know. He is also concerned with the expense during the day, the amount of the pay-roll, the amount of money invested, and the percentage of profit on the total investment.

So it should be with the farmer. What does it mean to say that Farmer Jones sold \$8,000 worth of alfalfa seed last year and quit at that. It means a thrill if he did this at an expense of \$2,000, including the interest on his investment, and it means a ‘thud’ indeed if he did it at an expense of \$12,000.

Similarly it means nothing of value or interest to learn that a farmer raised sixty bushels of wheat, and it means but little more to be told that he raised sixty bushels of wheat per acre if the value of the land and the value of the water used to raise this crop are not also given.

The fundamental principle upon which all farming should be conducted is this: Make the greatest possible legitimate percentage of profit on the water, the land and the labour required to produce a crop. The man who raises 3,000 bushels of wheat with a profit of forty per cent is more deserving of praise than he who raises ten times as much, or 30,000 bushels, with a profit of but eight per cent.

Let me show you what I mean by this percentage of profit by applying the above principle to a series of carefully conducted scientific investigations made by the Utah Agricultural College. The purpose of the investigation was to determine what quantity of water applied to different crops will produce the greatest percentage of



A Sunday afternoon in midsummer on Henderson Lake.

profit. For this purpose I shall assume that the land is worth \$50 per acre, water \$50 per acre-foot, and grain a reasonable market price.

Since in the data furnished there is no information given concerning the cost of labour required to produce the crop, I shall assume further that the use of the land and of the water already given are the only investments made, and that the crop produced is all profit. These assumptions are made solely for the purpose of presenting comparisons, and while without taking into account the cost of the required labour, results cannot be accurately obtained, and the figures presented show greater differences in 'percentage of profit' than actually exist, these figures should induce agriculturists to secure definite scientific data. Only thus can they 'make the greatest possible legitimate percentage of profit on the water, the land and the labour required to produce a crop.'

TABLES.

All areas used are one acre.

All land is valued at \$50 per acre.

All water is valued at \$50 per acre-foot.

The value of the crop is given at the head of each table.

The amount of water supplied is measured in acre-inches.

The land and water together are assumed to be the 'total investment.'

The crop is regarded as all profit.

The percentage of profit used in these tables means the percentage the crop is of the 'total investment.'

Bulletin No. 117 referred to is issued by the Agricultural College of Utah, and is entitled, 'The Yield of Crops with Different Quantities of Irrigation Water' (Address, Logan, Utah.)

TABLE No. 1.

(Bulletin No. 117,) (Value 50 cents per bushel.)

WHEAT.

	5.00	7.50	10.00	15.00	25.00	35.00	50.00
Water applied in acre.....inches	5.00	7.50	10.00	15.00	25.00	35.00	50.00
Value of land.....\$	50 00	50 00	50 00	50 00	50 00	50 00	50 00
Value of water applied...\$	20 89	31 20	41 60	62 50	104 00	146 00	208 00
Total investment.....\$	70 80	81 20	91 60	112 50	154 00	196 00	258 00
Crop in bushels.....	37 81	41 53	43 53	45 71	46 46	48 55	49 38
Value of crop.....\$	18 90	20 77	21 76	22 85	23 23	24 27	24 69
Percentage of profit.....	26 6	25 5	23 7	20 3	15 1	12 4	9 6

TABLE No. 2.

(Bulletin No. 117, page 82.) (Value 50 cents per bushel.)

OATS.

	5.00	10.00	15.00	20.00	45.00
Water applied in acre.....inches	5.00	10.00	15.00	20.00	45.00
Value of land.....\$	50 00	50 00	50 00	50 00	50 00
Value of water applied...\$	20 80	41 60	62 50	83 30	187 50
Total investment.....\$	70 80	91 60	112 50	133 30	237 50
Crop in bushels.....	62 28	54 76	71 54	80 70	79 06
Value of crop.....\$	31 14	23 38	35 77	40 35	39 53
Percentage of profit.....	44 0	30 0	31 8	30 1	16 6

TABLE No. 3.

(Bulletin No. 117, page 84.)

(Value 78 cents per bushal.)

BARLEY.

Water applied in acre.....inches	7 50	15 00	25 00	39 50
Value of land.....\$	50 00	50 00	50 00	50 00
Value of water applied.....\$	31 20	62 50	104 00	164 60
Total investment.....\$	81 20	112 50	154 00	214 60
Crop in bushels.....	68 76	67 66	66 15	62 59
Value of crop.....\$	53 69	52 70	51 60	48 80
Percentage of profit.....	66 0	46 8	33 5	22 7

TABLE No. 4.

(Bulletin No. 117, page 87.)

(Value \$1 per bushel.)

CORN.

Water applied in acre.....inches	7 50	10 00	15 00	20 00	25 00	30 00	55 00
Value of land.....\$	50 00	50 00	50 00	50 00	50 00	50 00	50 00
Value of water applied.....\$	31 20	41 60	62 50	83 30	104 00	125 00	229 10
Total investment.....\$	81 20	91 60	112 50	133 30	154 00	175 00	279 10
Crop in bushels.....	79 14	89 52	93 93	91 58	99 16	97 12	96 78
Value of crop.....\$	79 14	89 52	93 93	91 58	99 16	97 12	96 78
Percentage of profit.....	97 4	97 7	83 4	68 7	64 3	55 5	34 6

TABLE No. 5.

(Bulletin No. 117, page 91.)

(Value \$12 per ton.)

TIMOTHY.

Water applied in acre.....inches	7 50	15 00	30 00	60 00	100 00
Value of land.....\$	50 00	50 00	50 00	50 00	50 00
Value of water applied.....\$	31 20	62 50	125 00	250 00	416 60
Total investment.....\$	81 20	112 50	175 00	300 00	466 60
Crop in pounds.....	3,982	3,844	6,054	8,406	2,214
Value of crop.....\$	23 89	23 06	36 32	50 43	13 28
Percentage of profit.....	29 4	20 5	20 7	16 8	2 8

TABLE No. 6.

(Bulletin No. 117, page 98.)

(Value \$10 per ton.)

ALFALFA.

Water applied in acre.....inches	10 00	15 00	20 00	25 00	30 00	50 00
Value of land.....\$	50 00	50 00	50 00	50 00	50 00	50 00
Value of water applied.....\$	41 60	62 50	83 30	104 00	125 00	208 00
Total investment.....\$	91 60	112 50	133 30	154 00	175 00	258 00
Crop in pounds.....	9,884	7,546	9,097	9,354	8,840	10,813
Value of crop.....\$	49 42	37 73	45 48	46 77	44 20	54 06
Percentage of profit.....	53 9	33 5	34 1	30 3	25 2	20 9

TABLE No. 7.

(Bulletin No. 117, page 102.)

(Value \$3 per ton.)

SUGAR BEETS.

Water applied in acre.....inches	5 00	10 00	15 00	20 00	30 00	50 00
Value of land.....\$	50 00	50 00	50 00	50 00	50 00	50 00
Value of water applied.....\$	20 80	41 60	62 50	83 30	125 00	208 00
Total investment.....\$	70 80	91 60	112 50	133 30	175 00	258 00
Crop in tons.....	13 78	18 63	19 45	21 28	20 82	24 54
Value of crop.....\$	68 90	93 10	97 20	106 40	104 10	122 70
Percentage of profit.....	97 3	101 6	86 3	80 0	60 0	47 5

TABLE No. 8.
(Bulletin No. 117, page 106.) (Value 50 cents per bushel.)

Water applied in acre.....inches	5'00	7'50	10'00	15'00	20'00	30'00	45'00	60'00
Value of land.....\$	59 00	50 00	50 00	50 00	50 00	50 00	50 00	50 00
Value of water applied.....\$	20 80	31 20	41 60	62 50	83 30	125 00	187 50	250 00
Total investment.....\$	70 80	81 20	91 60	112 50	133 30	175 00	237 50	300 00
Crop in bushels.....	154'00	182'00	195'00	227'00	267'00	244'00	253'00	304'00
Value of crop.....\$	77 00	91 00	97 50	113 50	133 50	122 00	126 50	152 00
Percentage of profit.....	108'7	112 0	106'3	108'8	100'1	70'0	53'2	50'6

Summarizing for wheat: When but 5 acre-inches of water are used in addition to the 15 inches of rainfall, the crop produced is nearly 27 per cent of the value of the land and water together. But when 50 acre-inches of water are used, the crop is less than 10 per cent of the investment.

When 5 acre-inches of water are applied, the yield per inch is 7.56 bushels; but when 50 acre-inches are applied, the yield per acre-inch of irrigation water is but 0.99 bushels.

For oats with 5 inches of water the profit is 44 per cent, while with 45 inches it is less than 17 per cent.

For barley with $7\frac{1}{2}$ inches of water the profit is 66 per cent, while with $39\frac{1}{2}$ inches of water it is less than 23 per cent.

For corn with $7\frac{1}{2}$ inches the profit is more than 97 per cent, while with 55 inches it is less than 35 per cent.

For timothy with $7\frac{1}{2}$ inches of water the profit is nearly 30 per cent, while with 100 inches it is less than 3 per cent.

For alfalfa, using 10 inches of water the profit is nearly 54 per cent, while using 50 inches it is less than 21 per cent.

For sugar beets with 5 inches of water the profit is nearly 98 per cent, while using 50 inches the profit is less than 48 per cent.

For potatoes, using 5 inches of water the profit is nearly 109 per cent, while using 60 inches the profit is less than 51 per cent.

Since water is the intrinsic thing that gives farm land its value, it is of the greatest importance that we so use it to produce with reasonable effort the greatest amount of crop product. It is not simply the maximum yield in crop per acre that tells when this desirable condition prevails.

The experiments performed at the Utah Agricultural College clearly indicated that irrigation water produces the greatest amount of farm products when it is distributed over a comparatively large area. The authors of Irrigation Bulletin No. 117 expressly state that 'the best quantity of water to be used for the various crops ordinarily grown is from 10 to 20 acre-inches,' and that 'the best quantity lies probably nearer the former figure.*' While there is some doubt as to whether these conclusions can be applied safely where rainfall, other climatic conditions, and the character of the soil, are vastly different, they do point clearly to the fact that if the amount of water we now use for purposes of irrigation were distributed over a greater area it would produce bigger profits. Knowing this to be true, if we act well the part of wise men, we shall return to our farms and there commence to determine,

* Bulletin No. 117, page 117.

by a careful keeping of records, in what proportions the land which belongs to us and the water which is ours, shall be combined to bring the best results.

And what do I mean by keeping records? I mean that a farmer shall know how much water in acre-inches, he puts upon his land every time he irrigates it, how much he used during the irrigation season, and what the results are in the way of crop production. Records of these results are to be kept from year to year. After a while farmers will learn that if they use the same amount of water on double the land, or on three or four times as much area, the 'percentage of profit' will be greater. Further, and still more gratifying, this greater profit will be figured on an increased capital.

This is a question, too, of the conservation of the natural resources of the country. To my mind, it is a question of such importance and magnitude that if we individual farmers continue to play the selfish part, continue to try to hold title indefinitely to water which we cannot or do not put to profitable use, the hand of the law will be extended, and the dog will be dragged from the manger.

In the State of Utah, the day is passing in which men who are untrained are used for watermasters. The large irrigation companies are having the water measured and their records kept by men well trained in the measurement of water and other branches of hydraulic engineering. These companies have demonstrated that it pays to have this important work done by men who are well qualified, by technical training, to do it. The companies find that they make no investments which bring better returns than the money paid to this expert irrigation engineer. When a company has its records kept by such an expert, it moves forward, having the 'reins in hand.' By so doing profits of the farm can be anticipated early, and calamities or disasters can be foreseen, if not actually averted.

In Utah, under the direction of the United States Geological Survey, irrigation companies on our largest streams are uniting and are measuring the discharges of all the streams connected with their projects, including the discharge of the main canals belonging to the different companies. All these measurements are not only so made that they carry the stamp of approval by the government, but they also become a portion of the public government record. They are of great value to those, who for any reason whatever, are concerned in the flow of these streams, but to those whose interests are so great, and so intricately involved in the measurements of these streams, that their rights must eventually be adjudicated by the courts, the value of such records, unquestioned as their accuracy must be, is almost immeasurable.

During the present irrigation season, the Commercial Club of Salt Lake City has recognized the seriousness of producing only half or one-third as much in farm products as the comparatively small supply of water we have in Utah can yield. They perceived further that an excessive use of water in some sections is fast turning valuable farms into valueless water-logged land. They, therefore, called a convention of the officials of the irrigation companies and of those also who measure water and keep the record for these companies. At this convention the intense seriousness of the situation was explained.* An organization was effected, which includes the leading irrigation companies in Utah. Its purpose is to devise and to

* Why Irrigation Water should be Measured—Bulletin issued by the University of Utah, Salt Lake City.

keep proper and uniform records for these companies. All of this work is being done under the direct supervision of an expert irrigation engineer from the Utah Agricultural College. It is hardly hoped to do more this season than to make a beginning in this direction. The work has been begun with the hope that in the immediate future all the records of the water used by the irrigation companies and of the results obtained by its use will be available. From these, farmers can learn how, wisely and properly, to make the greatest profit with the least effort on the smallest capital.

The methods to be used for measuring water and the form of record to be kept were also discussed in detail at this convention of irrigators and water measurers.†

In conclusion, let me sum up briefly the points I have attempted to present.

First, that in Utah we are trying to do our farming scientifically. By keeping records, we aim to learn from the experiences, the shortcomings, the mistakes of the past, how best to irrigate in the present and in the future.

Second, it has been demonstrated in Utah that the crop produced does not increase directly with the amount of irrigation water applied to the soil. In general, a much greater profit can be produced by the water at present in use if it is distributed over a larger area of land.

Third, that with excellent results, a new kind of watermaster is being used in Utah—a real hydraulic engineer, who is trained in keeping records and making water measurements.

Fourth, that in addition to using trained engineers for watermasters, the irrigators of Utah are making the measurements of the flow of natural streams and important canals in conjunction with and under the supervision of the United States Geological Survey.

Fifth and last, the farmers of Utah are proceeding rapidly but scientifically, and therefore surely, to 'Make the greatest possible legitimate percentage of profit on the water, the land and the labour required to produce a crop.' (Applause.)

CHAIRMAN.—As Mr. Kelly, who was to have addressed us, is not present for the moment, I will ask Mr. Pearce to present the report of the Committee on Resolutions, and immediately after this has been presented, a vote will be taken on the next place of meeting and the election of officers will be proceeded with.

MR. PEARCE.—Mr. President, ladies and gentlemen, the first resolution is the following in connection with the Water Users' Association of Cypress Hills desiring to join this association if the constitution will permit such an affiliation:—

RESOLUTION No. 1.

Moved by Mr. Curry, seconded by R. S. Stockton:

Whereas, the Cypress Hills Water Users' Association has been formed for the purpose of promoting the practice of irrigation farming in the vicinity of the Cypress Hills, and has applied for affiliation with this association.

Therefore, be it resolved, that this association welcomes the Cypress Hills Water Users' Association to membership in the Western Canada Irrigation Association and to representation at the annual conventions.

† Bulletin No. 5, Measurement of Flowing Streams. A Simple Accurate Method of Using the Weir, University of Utah, Salt Lake City, Utah.

CHAIRMAN.—You have heard the resolution. Carried.

Mr. PEARCE.—This is a resolution in connection with the sending of an invitation to represent this association at the next Irrigation Congress to be held in Oregon:—

RESOLUTION No. 2.

Moved by Professor Elliott, seconded by Dr. Dickson:

Whereas, the Western Canada Irrigation Association did invite the Oregon State Irrigation Congress to send a delegation to our Seventh Annual Convention;

And whereas, the Oregon Irrigation Congress in session at Portland, Oregon, January 11 to 13, 1913, did, by resolution, appoint its president, William Hanley, and its secretary, Joseph T. Hinkle, to attend this convention, with power to appoint additional delegates, not exceeding five in number;

And whereas, the secretary of said congress, and John H. Lewis, Oregon State Engineer, are now in attendance at this convention and constitute a valuable addition to our programme;

And whereas, these two organizations are working hand-in-hand for the attainment of the same end, to wit, the highest possible utility of lands;

Now, therefore, be it resolved, that we appreciate the representation of the Oregon Irrigation Congress in this convention, and hereby authorize the Executive of this convention to appoint two or more representatives of the Western Canada Irrigation Association to attend the 1914 session of said Congress as representatives of this association.

CHAIRMAN.—You have heard the resolution. Carried.

Mr. PEARCE.—Regarding the resolution submitted to this association by the Cypress Hills Water Users' Association, from information obtained it would appear that resolution No. 2 is now being acted upon.

As to No. 4, regarding the request that the legislative assemblies of Alberta and Saskatchewan make an annual grant of \$1,000 to this association, it may be stated that action has been already or will shortly be taken in connection with this matter, in any event the resolution does not appear to require any action by this committee of the Western Canada Irrigation Association, it being merely a suggestion or request by the Cypress Hills Water Users' Association that such a request should be made.

As to resolution No. 5, it might be well to point out that as this is wholly a matter of administration, and there is no doubt that the Irrigation Branch of the Department of the Interior, which has the matter in hand, is doing its best to solve the matters brought up in this resolution. It might be considered presumptive for a party of laymen to point out to the Irrigation Branch, largely composed of experts, the best mode of giving effect to its opinion of what is required.

As to resolution No. 6. This is merely an invitation to hold the convention in the town of Maple Creek in the year 1915. A year from now will be as soon as this association could take action in the matter, and it submits that such action can be taken only by the association in session, and therefore requires no action by the Resolution Committee.

That leaves Nos. 1 and 3 to be disposed of, and the Resolutions Committee submit that such can possibly best be dealt with by the following resolution, care being taken not to make the resolution applicable to any particular district.

RESOLUTION No. 3.

Moved by E. Foley-Bennett, seconded by C. E. Lawrence:

Whereas the climate and soil conditions are varied and dissimilar in many respects in different portions of the irrigation districts of the West, and whereas many of the districts are widely scattered, covering a very large area, so that any central office for British Columbia and another for Alberta and Saskatchewan must necessarily be in many cases at a considerable distance from where irrigation is practised, therefore be it resolved that the respective governments having jurisdiction be urged to establish demonstration farms at such points as will meet the particular requirements of the country, and also to take such steps as to render communication between the water users and the administration as convenient as may be reasonably possible, by establishing sub-offices or the periodical visiting of a qualified official, thus enabling the water users to readily obtain the desired information and advice.

CHAIRMAN.—You have heard the resolution. Carried.

Mr. PEARCE.—Those are all the resolutions that have been placed in my hands. There may be other resolutions of such a nature that they do not require to be acted upon by the committee, but if there are such, I would like them at once.

CHAIRMAN.—Our last speaker was from across the line. I now have pleasure in introducing a man from another British Dominion, not across the line, but across the earth. We are very glad to have a man from the Antipodes here where they are working out similar problems in the development of agriculture. We are very glad indeed to welcome Mr. J. W. Arthur Kelly, Commissioner for Victoria, Australia.

Mr. J. W. ARTHUR KELLY.—Mr. Chairman and gentlemen, the subject you have been good enough to ask me to talk to you upon is 'Australia, its Irrigation and Land Settlement.' 'What do you know about Australia?' I recently overheard one man say to another as I entered a hall in which I had arranged to lecture in the State of Washington. 'Well, I know,' answered the second man, 'it's an island somewhere in the south, and I imagine it can't be very big, and that it's mostly desert.' You will observe, please, that this was before the meeting.

Australia is an island and it is in the south. An island under the Southern Cross, set in the perpetual sunshine of southern skies. But an island continent. Three-quarters of the area of the whole of Europe, that continent which has cradled all that is most typical of culture and progress. Four-fifths the size of all the territory embraced in your own great Dominion of Canada. Larger by 417 square miles than the country of your neighbour, Uncle Sam. And twenty-five times greater in extent than the British Isles, from whose loins both we and you alike have sprung and under whose grand old flag of justice and freedom the young sister nations of Canada and Australia are working out a kindred destiny. An island continent presenting a spectacle unique in the world's history. Peopled by one white race, one in

language, one in traditions and in community of interests and in national ideas: an Anglo-Saxon people.

But my American was most widely astray in his 'desert' idea. Australia has vast territories of rich fertile lands, watered by magnificent perennial streams; and in semi-arid lands possesses in the great Australian artesian basin, which extends over 570,000 square miles, the greatest artesian system yet known in the world.

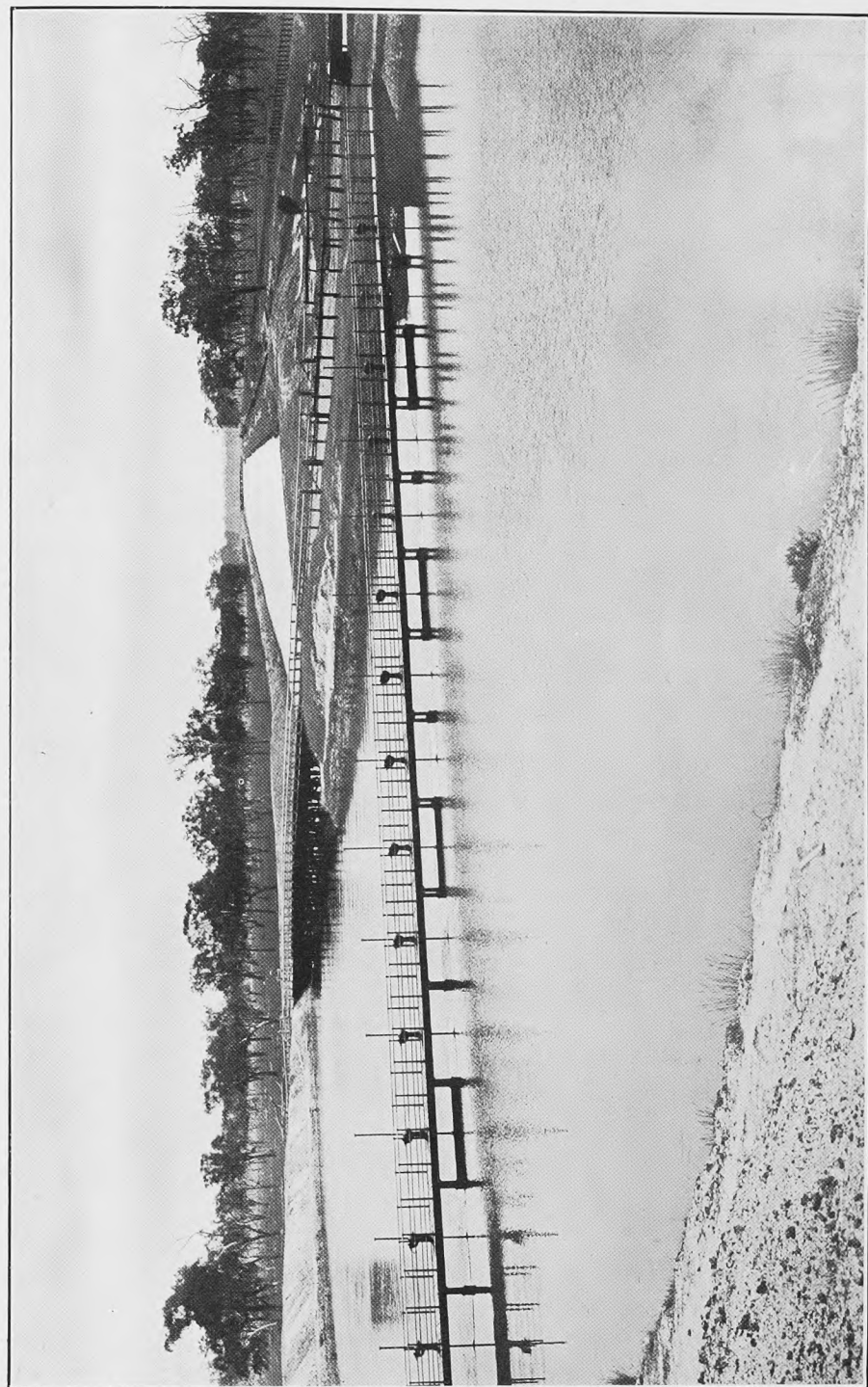
The irrigation systems in operation in Australia so far, however, are chiefly gravity schemes from the principal rivers. The mother state of New South Wales has just completed in one single scheme, a work that can irrigate an available irrigable area of 560,000 acres, and then some. Had their representative, Mr. Quinn, been able to have been present at this conference, as he had hoped to be, he doubtless would have had an interesting story to tell us of this. But lest I overstep my time and your patience, permit me to curtail the spaciousness of the subject allotted me and make it, '*Victoria, its Irrigation and Land Settlement.*' And then, too, I can more surely speak of the things whereof I know with that knowledge which comes from the well of personal experience.

I said ours is not an arid land. Victoria has an annual precipitation of 25 inches, and Northern Victoria, where our irrigation areas are located, has an annual rainfall of 16 to 17 inches. Why then an irrigation system? For we have various existing successfully worked systems, both by direct pumping from the Murray river and by gravity flow from the Goulburn river. Let me make that clear by concentrating upon our most comprehensive gravity scheme, the Goulburn-Waranga. The land covered by this scheme, totalling over 1,000,000 acres, is land that has been successfully farmed for the past thirty years without irrigation. From such land my friend, Mr. John Holschier, within nine miles of my own home town of Echuca, has grown wheat that over a field of 100 acres has averaged 41 bushels to the acre. That wheat weighed 65 pounds to the imperial bushel, and it took the champion prize against the world in 1909 at Seattle, U.S.A. From such land a flock of 28,000 sheep I am acquainted with gave an average clip in 1911 of wool per sheep of 11 pounds 10 ounces, and that wool returned the farmer in cash, \$2.42 per head for the whole flock of 28,000 sheep; and the sheep, you will remember, were ranged in the open the whole year through on non-irrigated natural grasses—nothing very arid about land like this. Why then irrigation? During the sessions of this conference stress has been laid, and well laid, by eminent speakers, upon the value of mixed farming and intensive culture. The Bamawn district, fifteen miles from my home town of Echuca, in thirty years of non-irrigated farming of such wheat and wool as I have instanced, has been prosperously settled, but settled to the extent of three persons to the square mile. In a single year I have witnessed that settlement under an irrigation system that has made intensive farming not only profitable some seasons but profitable every season, expand from three persons on each 640 acre section to fifty persons upon each 640 acre section, and can instance you to-day a man in the person of Mr. MacDonald, of the Cohuna irrigation district, perhaps twenty-five miles from the Bamawn district, who sold his 640 acre section down to 80 acres; and then upon the severe test of a basis of seven years, showed a return from one-half of that 80 acres, that is 40 acres, of \$4,800 per annum—more than he previously made out of his whole farm of 640 acres. In the past three years the Gov-

ernment of Victoria has re-acquired from the original large landholders 100,000 acres of the 1,000,000 acres already mentioned, and has in that period settled ten times as many settlers upon it as prospered there before. Though we may not endorse the poet's picture, 'Where every rood of ground maintained its man,' the immense gain of such an alteration to the community as we have thus accomplished under irrigation is beyond doubt.

The Goulburn river, a tributary of the Murray river, which is 1,700 miles long (some river!), has an even annual flow, tested over twenty years, of 97,120 million cubic feet. Little more than two per cent of that flow has so far been used by the irrigators. By means of the Goulburn weir, constructed of granite, in width 400 feet from bank to bank, and rising 50 feet from the bed of the stream; and by the Waranga storage basin, 220,000 acre feet—acre feet, not cubic feet—have been stored. Dr. Elwood Mead, who is in charge of the whole government irrigation settlements, plans by a dam 30 feet high on the present weir, and by raising the Waranga basin 10 feet, to increase this conversation to 43,560 million cubic feet. I have met at this conference some of Dr. Mead's old friends. For we borrowed him from the United States Government at Washington for seven months, and we have kept him for seven years, and if the Lord spares him we will keep him for seventy-seven. The total length of the two existing main channels is 124 miles, and the principal one of the two has 600 miles of main distributing channels; for the Government of Victoria has already expended over sixteen million dollars upon irrigation works, successfully completed and operating; and here you may be interested to learn, the position of the government on this question in my country. I have not had the privilege yet of studying your irrigation systems in western Canada, although I hope to do so; but during the past few months I have seen something of numerous systems in the United States. As you know, the United States is fast becoming the Mecca of irrigation students, for they have shown magnificent courage and enterprise in successfully demonstrating the value of artificial watering. But I found cases in which the lion's share of the gains are going to the lawyers; for the litigation over prior rights and individual interests seems interminable. Litigation over water is unknown in Victoria; for our state, by the simple virtue of not allowing any private ownership of land within one chain of her rivers and streams, possesses for the whole of her people, for all time, all riparian rights.

Our irrigating system is a government system, and unlike the projects that the United States Government does control, the land of the Victoria irrigator is not loaded for ten years with the cost of construction. His water right costs him nothing. He gets his water by an annual payment of the cost of delivering it to him; and having a gravity system over uniformly level land, free from engineering difficulties, that cost is probably less than is paid under any guaranteed water project in the world. This is, however, but the beginning of the proposition. The government grants the land upon a deposit of three per cent of his purchase money, and thereafter two half-yearly payments of three per cent covers both purchase money and interest and acquires the freehold for the settler in thirty-one years. The state also builds the settler's house, should he wish it, charging five per cent interest and extending the repayments of principal over fifteen years. For the aim is the home. The settler must reside. No absentee landlord need apply. No land speculator holding his own



The Goulbourn-Waranga main ditch, Government of Victoria, Australia.

block idle to reap without sowing the enhanced value created by the combined industry of the resident producers, can get into the Victorian Government irrigation areas. And the government further assists by advances at five per cent interest on improvements, by advice and practical demonstration by its experts and by other direct methods to insure to every capable, hard-working settler the success his industry deserves.

Your Government of Canada is to be admired for the splendid work they are doing to settle the wide spaces of your great country, and I admire with honest pride of race, for we are kith and kin to each other, the great part you have played in the past ten years in peopling this part of the British Empire. For you have difficulties we in Victoria know nothing of. In our irrigation areas we have practically no winter. Our mean summer temperature is 73 degrees Fahr., and mean winter 61 degrees Fahr., above zero. With the climate of southern Italy or Spain or southern California, we grow just about every fruit and every product bountiful nature knows; except it may be some tropical fruits it takes half a life time to acquire a taste for.

Under Dr. Mead's system, by which the irrigator gets the water as he requires it, in our climate he has but to 'Tickle the soil with a hoe that it may laugh with a harvest.' But he must tickle it early and often, for intelligent tillage, whether on a dry farm or an irrigated farm, must ever be the sesame to fortune's opulent horn.

Alberta is rich in such a man as Mr. Fairfield, whose alfalfa we inspected yesterday, and whose paper upon its culture we so much enjoyed, and he is justifiably proud of the hope he has of possibly getting a third cutting of the field. But in Victoria, Mr. Fairfield would cut his alfalfa six times in the season; and because Australia is one of the greatest stock producing countries in the world, ranging all stock on the open natural herbage all the year round; and because its irrigated areas are relatively small to its great semi-dry areas, he would have the best market in the world for it, in unlimited quantities, when he had reaped it. Come back with me and try it, Mr. Fairfield. Then Victoria has a long coast line and no long railway hauls, and the government own and operate all the railroads. The land I speak of is within 100 to 140 miles by existing railroad from Melbourne, our Capital and chief shipping port, population 600,000. To our fruit grower the modern methods of pre-cooling fruit, and shipping it in refrigerated chambers to all parts of the world, has opened up a golden era; for we harvest our fruits when you, and all the rest of the thickly populated world, are in winter, and so enjoy the finest of all monopolies, the monopoly of the settler who can sell what the buyer wants when his selling rival cannot. With a pumping scheme on the Murray Mildura our old established fruit settlement supports 6,500 persons on 12,500 fruit planted acres, and she by proper and co-operative management, cashed her fruit this season for one and one-half million dollars. For Victoria's fruit orchards, citrus groves and vineyards have a clean bill of health.

Here, then, we have in a nutshell the reason of Victoria's expenditure of \$16,000,000 on irrigation schemes. We have done well in the past with fruit and wool on our big holdings, but endowed as we are by nature with a continuously growing climate, our rich lands so near the shipping port, offer far higher gains to the skilled irrigator with his intensive culture methods.

'Intelligent men nowadays not only pray for rain, they pay for it.' And in so doing reap their reward a hundred fold. (Applause.)

CHAIRMAN.—Mr. Kelly's paper is open for discussion by those who wish to avail themselves of the opportunity of asking questions.

Mr. PEARCE.—I regret that I was not here at the beginning of Mr. Kelly's speech. However, I was in time to hear him dilate on the advantages of the country in growing a crop all the year round. I had the good fortune to visit the state of Victoria not quite two years ago, in company with Dr. Mead and Mr. McKenzie. Mr. Mead laid great emphasis on the fact that they could grow crops all the year round. Well, I was not going to take that for granted. I said to him, 'You know that with even one crop a year we exhaust the soil faster than we should. What would happen if we grew two? Outside of that,' I said, 'I think very few people in the Tropics know the advantage of frosting for fertilization of the soil.' He had to admit there was something in that, and I think that if the last speaker would consider it and go across the plains of South Australia, he would admit that if they only had some of our winter frosts they would be very beneficial.

Mr. KELLY.—Hear, hear.

Mr. LAWRENCE.—Mr. President, I think Mr. Pearce will agree with me when I say that, like myself, he has been a student all his life. I have no hesitation in getting into that boat with him, and it is a rather singular thing that during the last few months I have been studying conditions in Australia and found so many good things there that I presumed to put some of the points before the Provincial Government of British Columbia, but sir, although I learned much from the wonderful literature they sent me and although there is much in that that our government might learn from, especially from the way the books are got up, I have learned more since Mr. Kelly has been speaking than I had previously. I want to add to my information on one point and he has given me the opportunity because he has spoken about sheep in Victoria. You said, sir, that your sheep—you spoke of 28,000—were out on what we should call the open range nearly all the year. Will you tell us what those sheep are feeding upon? I have read that they feed upon a kind of herbage called spinifex. I thought if we could import it into the semi-arid districts of these provinces it would be a very great advantage to us.

Mr. KELLY.—I am delighted to meet Mr. Pearce and Mr. Lawrence, particularly as they are interested in my own country. Mr. Pearce's remarks were just what one would expect from a gentleman of his wide experience. I am sorry I have no personal knowledge of the native grass Mr. Lawrence speaks of, sufficiently to enable me to enlighten him. In the northern part of Victoria the sheep do best on what we call the trefoil.

NOTE.—Further discussion regarding sheep feed took place here between the above gentlemen, but through an unavoidable accident it was not reported.—(Secretary.)

The following address by Mr. P. E. Quinn, of Australia, is incorporated in the proceedings at this point. Mr. Quinn was prevented from attending in time, but as his address is of interest in showing what has been done in Australia under irrigation conditions, it is included in the report.

IRRIGATION AND TRADE IN AUSTRALIA.

Mr. P. E. QUINN.—The leading characteristic of Australia is that it is a land of almost perpetual sunlight. There, climate is one of the most valuable national assets, as evidenced by the fact that agricultural operations go on unimpeded all the year round, and no-where does the weather call for the housing of cattle.

Accustomed as the people of Canada are to the contemplation of great mountain ranges, it sometimes surprises them to learn that in the vast Island Continent, sweeping over an area as great as that of the United States, the highest mountain is only just over 7,000 feet. It is on the summit and slopes of this highest land that alone in the great spaces of Australia the snow lies through the short winter. Occasional fleeting snowstorms fall on the mountains and the table-lands elsewhere in the east of Australia, the southern portions; but it is not an exaggeration to say that ninety-nine out of every hundred people in the Commonwealth have never in all their lives seen snow. The influence of mountains on rainfall is very great, but because Australia has no mountains comparable to those of Canada, it must not be assumed that it is essentially arid. Over 865,412 square miles of its territory the rainfall is above twenty inches per annum. When it is remembered that considerably less than that is sufficient for safe farming, under dry-farming conditions, it will be obvious that, even when the proportion of rough and otherwise unsuitable land is subtracted, there is available in Australia an enormous area suited for agriculture. Of the area visited by more than twenty inches of rainfall, 12,107,000 only are cultivated as yet. But the qualities of the soil and climate are strongly emphasized by the production from these cultivated acres last year of grain, dairy products, fruit, &c., to the value of \$300,000,000. I quote figures for 1911-12.

The number of sheep ranging the natural pastures of the Commonwealth last year was 93,600,000. This is the largest national flock in the world. The wool clip from this flock was worth \$144,000,000. The country is amazingly adapted for sheep. This is shown, not only in the numerical increase, but even more in the improvement in the weight and quality of the individual fleece. In the early days the fleece averaged only $3\frac{1}{2}$ pounds. To-day the average weight is $8\frac{1}{2}$ pounds. It was 7 pounds in 1906 so that the weight of the fleece has grown $1\frac{1}{2}$ pounds in six years. This signifies a very remarkable accession to the wealth of the country, and the quality is concurrently increasing, so that it is impossible to say when the improvement in weight and quality is going to stop.

Of this vast flock, 16,000,000 sheep and lambs are slaughtered annually, and of these about 10,000,000 are exported annually, together with enormous quantities of beef. The chief market for this meat is the United Kingdom, although some comes to Canada, and importation has lately begun into the United States.

As population increases the agricultural lands now devoted to sheep raising will be taken for wheat and other crops. A great many farmers now mix wheat growing and sheep raising by putting their wheat land under sheep for a season. This rests the land and also improves it, while the land, instead of being unproductive while fallowing, returns a substantial profit to the farmer in wool and mutton.

As recent history shows that meat is appreciating, and must continue to appreciate in value, while wool and wheat are among the world's indispensable requirements, it is evident that Australia being specially adapted by nature for the production of these necessities, cannot but progress in material respects, that is in national wealth. At present there are 12,000,000 cattle in the Commonwealth, and this number may be largely increased. The Northern Territory, the great undeveloped province of Australia, contains some of the finest cattle country on the earth. What elbow room the Northern Territory affords is evident when I tell you that in an area of considerably more than half a million square miles there are at present only about 2,000 white men. There is room for a nation in the Northern Territory alone. The Federal Government is now engaged in preparing this country for settlers.

You know something of our butter in Canada. There are 2,100,000 dairy cows in the Commonwealth producing 200,000,000 pounds of butter, with other products of the dairying industry. Sweeping through so many degrees of latitude it is evident that every fruit and product known to man may be grown in Australia, if their production were profitable. Sugar cane, cotton, tobacco, bananas and such products of warmer climates grow in the north, while in the two-thirds of the continent which lies in the temperate zone there is a home for all kinds of fruits and cereals.

The salubrity of the climate is shown by the mortality figures. The death rate of the Commonwealth and New Zealand is the lowest in the world. The deaths per 1,000 inhabitants in Great Britain is 15.1, in Germany 18.1, in France 19.3, in Canada, which is a healthy country, it is 13.9, while in the Commonwealth it is only 10.4. We save our babies in Australia, where the infant mortality rate is a record of 75 per 1,000 children, against 118 in Great Britain, 124 in Canada, and 176 in Germany. We have a saying in Australia that 'Baby is the best immigrant.'

With natural conditions so favourable and with so small a population—on a country just larger than the United States we have a population less than greater New York—it may be wondered why at this stage we should resort to irrigation. The answer is that here and there irrigation is invited by the relationship of very fertile lands with a low rainfall to sources of water supply capable of irrigating them. Under natural conditions of water these lands would never be more than sheep pastures, but by the application of adjacent water they may be made the arena of close settlement and prolific production.

Australia, like Canada and the United States, is alive to the advantages of irrigation settlements on semi-arid but supremely fertile lands. It is better to grow men than sheep, and it would be bad economy to neglect any opportunity for closer settlement in Australia, with its far flung vacant spaces, in which even the sheep farmer on a moderate scale requires for his support quite considerable areas of land.

The most notable irrigation project, in my opinion, so far undertaken in Australia, is in the valley of the Murrumbidgee river in New South Wales, where this valley spreads out into the great alluvial plains of the interior. For a century these lands have been grazed by sheep. The natural rainfall is sixteen inches, and under dry-farming methods this region would be safe wheat growing country. But nature, as if with a wise prevision of man's future needs, cut a narrow gorge in the mountains, just below the junction of two rivers, the Murrumbidgee and the Goodradigbee. As these names may sound strange, I may say that they are from the language of the

almost vanished Aborigine of Australia. This gorge presented just such an opportunity as the engineer loves. By means of a giant wall a lake 19 square miles in area has been created, a wall 240 feet high and 900 feet along the crest. The waters of this lake commands by gravitation the lands of the Murrumbidgee Valley, selected by experts as most suitable for irrigation, these lands being 200 miles from the dam in the mountains. The land, so commanded by gravitation flow from the reservoir, is far greater than the capacity of the impounded water to irrigate so that a selection was made of the very choicest of the alluvial lands presented. The area is 250,000 acres, to which is added another 1,000,000 acres of dry land, distributed so that every irrigator will get a block of dry land three times the area of his irrigated block. This dry land has, as has been said, a rainfall of sixteen inches.

The soil in the irrigated area is of very high quality, loamy, deep and friable, and is fortunate in having natural drainage so favourable that no system of artificial drainage is required, a very important advantage. Owing to the light rainfall, the natural salts and mineral constituents of the soil have not been leached out, while the soil is virgin, never having been cropped. The temperature is markedly even—with a summer average of 74.9 and a winter average of 51.5. The range of products is remarkable—apples, pears, peaches, walnuts grow alongside the olive, orange, vine and fig. Alfalfa is a favourite crop, and up to eight cuttings a year are taken, while all grain, cane and root crops grow freely. The experience of this settlement is being watched with great interest throughout Australia, and after a few years very remarkable results are confidently anticipated. Hardly a fifth of the irrigated area is as yet in occupation.

The majority of the farms have been designed for mixed farming and contain fifty acres. Men with sufficient capital may, however, obtain up to a hundred acres of irrigable land, with three times as much dry land for depasturing stock, &c. There are two model townships on the area, each serving a separate division of the territory, and near these towns the land is cut up into horticultural blocks of ten acres. As it is considered advisable to encourage permanent labour on the settlement a system of workmen's blocks of two acres has been adopted, where labourers may settle. These small blocks are scattered through the area and will provide a resident fund of labour which will make the settler, who cannot work his own land without assistance, practically independent of casual farm labourers. The labourer, being as well a cultivator himself, may be expected to be more in sympathy with the aims and destinies of the whole scheme.

The project is from first to last a government one. All the lands covered by the scheme have been resumed at great cost by the Government of New South Wales. The tenure is leasehold, a crown grant being issued after five years' residence. When this grant has been obtained the land may then be disposed of by the settler, in the same way as any other lease, with improvements, goodwill, &c. The leasehold tenure renders it possible to insist that the settler will make his holding his bona fide place of residence, in other words, his home; for this is to be a place of homes where families will live fast-rooted in the soil.

Instead of paying a considerable sum for his land the settler will pay rent. This will be at the rate of $2\frac{1}{2}$ per cent of the estimated capital value of the land, which is arrived at by taking the aggregate cost of the land when resumed by the government,

and adding the cost on construction of the lateral channels which carry the water to the settler, the cost of roads for the settler's benefit, together with the cost of surveys. The rentals thus estimated will be extremely moderate. The interest on the government's outlay for the construction of the storage dam, and main canal, and the cost of maintenance and upkeep, will be met by the rates to be charged for the supply of water. The settlers will be charged \$1.20 per acre-foot of water, but the farmer will only pay half of this rate for the first year, with slight increases each year till the fifth year, when the full rates will come into operation. Taken with the leasehold principle, under which the farmer is charged only rent, these concessions will allow the farmer to concentrate practically the whole of his capital on the development of his holding.

In pursuance of this policy the farmer is granted assistance, in the erection of his house. For instance, the holder of a fifty acre block will get government assistance to the extent of \$2,000 and will be allowed ten years in which to repay this amount, with interest at the rate of five per cent; or building materials may be obtained on the same terms, if the farmer desires to build his own home. On similar easy terms the settler may have ten acres of his land ploughed and graded.

Factories for butter, bacon, canning fruit and vegetables are in course of erection, and later, if requirements justify it, there will be a government plant for the freezing of lambs and other products for export.

Farmers are expected to form co-operative associations for the complete handling of produce. The extension of the government railroads will bring every settler within at least ten miles of a railroad, which will be made accessible by good roads.

Farms on this irrigation area are being taken up as fast as they are made ready. This is not surprising for it would be difficult to find a fairer proposition anywhere.

Among the impressive works of the future will be the locking of the great Darling river, which for 1,000 miles of its course flows through alluvial plains, which require only the touch of water to burst into generous production. In years to come this lovely river will furnish vivifying water for rich margins of intensive culture along its banks.

In estimating Australia's water resources more than the face value is to be taken into account, for nature has deposited vast reserves of water under the surface. There are five great deposits in different parts of the continent. The largest, known as the Great Artesian Basin, underlies vast areas in the states of New South Wales, Queensland and South Australia. Its ascertained extent is 569,000 square miles. The number of bores existing is 2,350, giving a flow of 620,891,000 gallons daily. It appears that these artesian areas are supplied by the rainfall percolating through porous intake beds. To a limited extent the water of these wells is used for agriculture, but their chief service, so far, has been to provide water for stock. The bore water is carried for long distances in excavated channels through the paddocks in which stock are depastured. Curiously and fortunately, the artesian water is found in the arid and semi-arid districts and is thus a priceless asset. There is a reluctance in encouraging the use of this water for agriculture, inasmuch as experiment and experience have demonstrated that the supply diminishes as the number of bores increases. Very remarkable results have been obtained from intense culture around some of these bores. On one hundred acres of sorghum 8,000 sheep were fed for

three months, fifty bushels of oats, twenty bushels of wheat and thirty hundred-weight of hay to the acre have been harvested. Oranges of extraordinary size and excellence have long been grown; with vegetables and fruit of many kinds. But the significant fact is that a flow of 1,000,000 gallons per day, which will supply water for only 500 acres under agriculture, will provide water for stock over 70,000 acres. The artesian water in Australia is as yet something of an enigma, and it may yet be established that its quantity is ample to allow fairly extensive agricultural operations in intensive culture.

The great need of Australia is population. Upon the shoulders of a population less than that of greater New York is cast the burden of developing a territory as large as the United States, and not only of developing it, but defending, or at least providing for its defence. Considering the vast sums wasted on war, and on the preparation for war, how desirable seems that shining, but unfortunately, far distant vision of Tennyson, when the earth will be one great garden of peace:—

‘Every tiger madness muzzled, every serpent passion killed,
Every grim ravine a garden, every blazing desert tilled;
Roted in universal harvest, up to either pole she smiles,
Universal Ocean softly washing all her warless isles.’

The money devoted to militarism, if devoted to irrigation, would go far towards making this vision true. Some day, perhaps, peace will visit the earth, never more to depart. In the meantime irrigation is one of the chief works of civilization.

In Australia, too, our problem is rendered more difficult by our national policy as expressed in the phrase, ‘A White Australia.’ We are endeavouring to keep Australia as the inviolate heritage of the white race. Severed by the width of the world from Europe we are only a week’s sail from the shores of crowded Asia. Cheap labour we could have in abundance, if we chose, for every great work waiting to be done, but the price would be in all probability the loss of the country to an alien race and the irretrievable degradation of our own racial type. Australia will not buy material progress at such a cost, and whatever danger and difficulty our White Australia policy may bring to us in the future we know that our ideals have the sympathy of Canada and of all the white races.

The character of the trade of the Commonwealth may be deduced from Commonwealth industry. We export the products of our soil. In 1912 Australian production, excluding manufactures, was worth \$920,000,000. The exports were valued at \$382,000,000 and the imports at \$378,000,000. The oversea trade works out at \$153 per inhabitant. Comparing our trade with that of the country you know best, last year Canada imported \$176,000,000 worth more goods than Australia, but Australia exported \$85,000,000 worth more than Canada. Australia’s exports exceeded its imports by about \$4,000,000, while Canada imported \$250,000,000 more than she exported. Only four ports in the United Kingdom exceed the port of Sydney in tonnage of shipping. The trade of Australia has doubled in thirteen years.

With faster steamers reducing the distance between Australia and Canada, the trade of the two countries with each other will increase. To-day your ministers are endeavouring to arrange a reciprocity agreement with the Commonwealth Government. We welcome close relations with Canada. We have similar problems, similar great territory to develop, and we should join hands in the works of peace across the Pacific ocean, which means so much to both countries.

CHAIRMAN.—I will now call upon Mr. Fairfield to present the report of the Committee on Credentials.

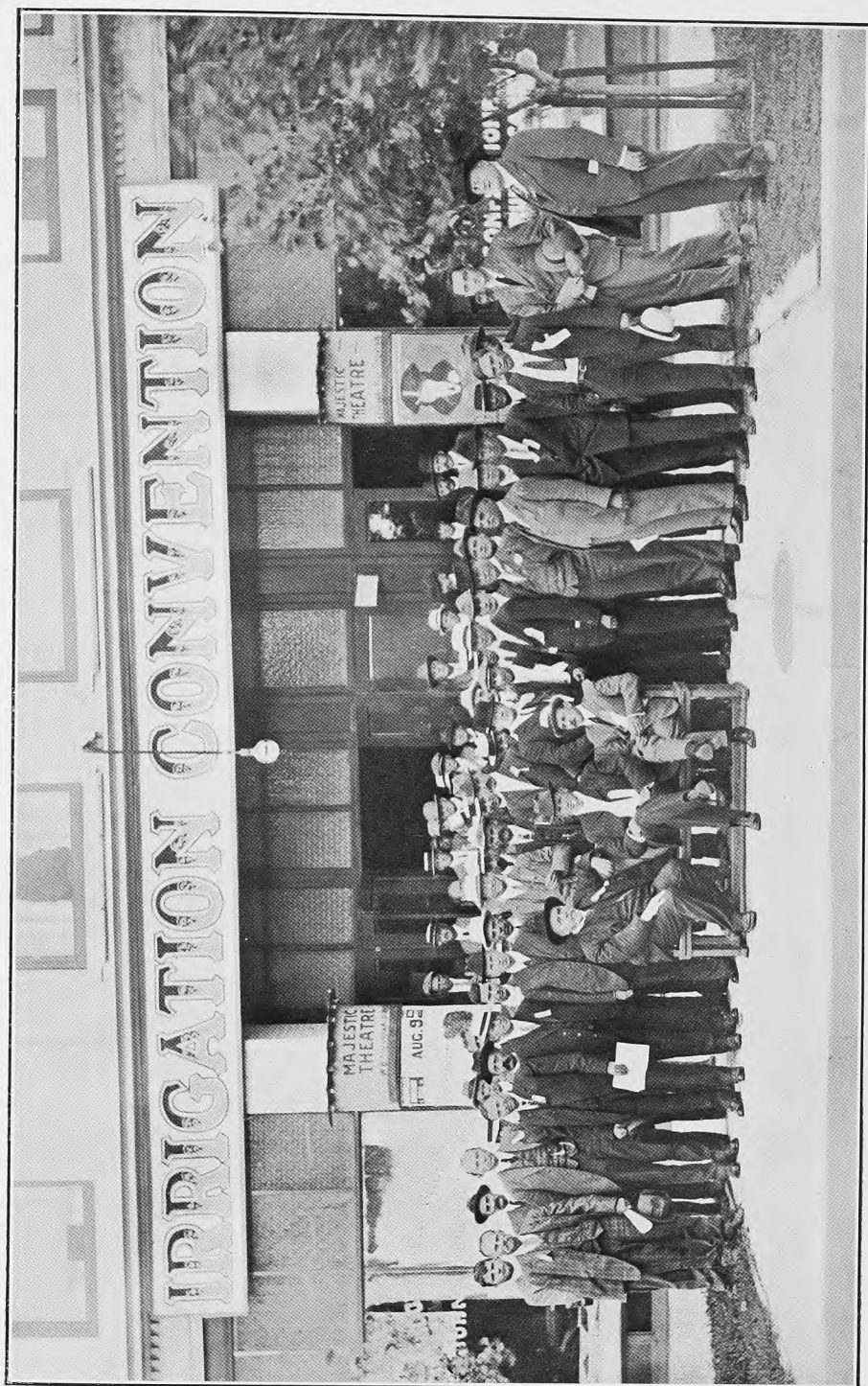
Mr. FAIRFIELD.—The Committee on Credentials beg to report that so far eighty-nine accredited delegates have registered, and forty-four are in attendance without being duly accredited. In this connection we wish to state that before the convention is over we would like to make some suggestions in regard to changing the constitution concerning membership, so that the matter can be taken up in due course.

OFFICIAL DELEGATES ATTENDING LETHBRIDGE CONVENTION.

Name.	Address.	Representing.
E. Adams.....	Lethbridge.....	President, Exhibition Board.
I. C. Armstrong.....	Cypress Hills.....	Secretary, Board of Trade.
L. O. Armstrong.....	Montreal.....	C. P. R.
Walter Ackroyd.....	Magrath.....	Agricultural Society.
G. F. Brundrett.....	Calgary.....	
J. L. Brown.....	Kamloops.....	Agricultural Society.
E. Foley-Bennett.....	Penticton.....	Mayor.
C. E. Bee.....	Taber.....	Southern Alta. Land Co.
H. C. Bender.....	Suffield.....	do do
W. A. Buchanan, M. P.....	Lethbridge.....	Lethbridge Herald.
E. N. Barker.....	Cardston.....	Vice-President, Board of Trade.
J. Crawthorne.....	Calgary.....	Irrigation Branch, Department of Interior.
A. Chamberlin.....	Kamloops.....	Board of Trade.
C. Chambers.....	Calgary.....	Irrigation Branch, Department of Interior.
V. D. Curry.....	Kamloops.....	Farmers Institute.
R. I. Crisp.....	Winnipeg.....	Department Natural Resources, C. P. Ry. Co.
C. Close.....	Lethbridge.....	City Council.
Dr. C. W. Dickson.....	Kelowna.....	City and Board of Trade.
F. W. Downer.....	Lethbridge.....	Board of Trade.
John Dixon.....	Cypress Hills.....	do
E. F. Drake.....	Ottawa.....	Department of Interior.
J. C. Dufresne.....	Penticton.....	Board of Trade.
Sen. G. L. Deveber.....	Lethbridge.....	City Council.
W. J. Elliott.....	Olds.....	Dean, Agricultural School.
W. D. Finley.....	Lethbridge.....	Secretary Associate Boards Trade.
W. H. Fairfield.....	".....	Superintendent, Dominion Experimental Farm.
M. H. French.....	Calgary.....	Department of the Interior.
G. V. Ferguson.....	".....	
T. A. P. Frost.....	".....	City Council.
W. A. Ellison Faukes.....	".....	do
R. H. Goodchild.....	".....	Department of Interior.
A. H. Gullickson.....	Medicine Hat.....	City.
Chas. G. Greer.....	Penticton.....	Board of Trade.
E. H. Humphries.....	Lethbridge.....	Vice-President, Board of Trade.
D. J. Hay.....	".....	Secretary, Board of Trade.
W. F. Hicks.....	".....	A. R. & I. Company.
W. D. L. Hardie.....	".....	Mayor.
E. B. Hume.....	Victoria.....	
G. N. Houston.....	Calgary.....	Department of Interior.
W. Huckvale.....	Medicine Hat.....	Cypress Hills Water Users Association.
J. T. Hinkle.....	Hermiston Ore.....	Secretary, Oregon, Irrigation Congress.
Henry Holmes.....	Raymond.....	Agricultural Society.
H. M. Holmes.....	".....	do do
G. W. Heathershaw.....	Magrath.....	do do
H. B. Hicks.....	Cranbrook.....	Water Branch, B. C. Government.
D. W. Hays.....	Medicine Hat.....	City Council.
G. H. Herringer.....	Cypress Hills.....	Water Users Association.
G. M. Hatch.....	Lethbridge.....	Board of Trade.
Allen Jack.....	".....	Exhibition Society.
C. W. Ives.....	".....	President, Board of Trade.
P. J. Jennings.....	Calgary.....	Department of Interior.
J. W. Arthur Kelly.....	Australia.....	Victoria Government.
Chas. Kane.....	Lethbridge.....	Agricultural Society.
C. E. Lawrence.....	Kamloops.....	Agricultural Association.
J. E. Lloyd.....	Suffield.....	Southern Alta. Land Co.

OFFICIAL DELEGATES ATTENDING LETHBRIDGE CONVENTION—*Concluded.*

Name.	Address.	Representing.
R. H. Lyman.....	Salt Lake City....	
Prof. J. H. Lewis.....	Salem, Oregon.....	Board of Trade.
O. T. Lathrop.....	Lethbridge.....	Minister of Agriculture.
Hon. Duncan Marshall...	Edmonton.....	Irrigation Company.
A. K. Mitchell.....	Kelowna.....	Department Natural Resources, C. P. Ry. Co.
H. B. Muckleston.....	Calgary.....	Kelowna Land & Orchard Co.
W. H. Moodie.....	Kelowna.....	Agricultural Society.
B. Matkins.....	Magrath.....	Dist. Inspector of Forest Reserves.
W. N. Miller.....	Calgary.....	City.
J. R. Mitchell.....	Penticton.....	General Live Stock Agt., C. P. R.
H. C. McMullen.....	Calgary.....	<i>Herald.</i>
C. M. McLennan.....	Lethbridge.....	City.
F. D. McNaughton.....	Strathmore.....	President Water Users Association.
Robert Needham.....	Cypress Hills.....	Agricultural College.
H. W. Newhall.....	Ontario.....	Department Natural Resources, C. P. Ry. Co.
G. H. Patrick.....	Strathmore.....	Commissioner of Irrigation.
F. H. Peters.....	Calgary.....	Department of Interior.
S. G. Porter.....	".....	Lethbridge Exhibition Board.
W. H. Pawson.....	Coaldale.....	Associate Boards of Trade.
B. S. Pawson.....	".....	Department of Interior.
Capt. R. Palmer.....	Lethbridge.....	City Council.
R. C. Pegler.....	Bassano.....	do
G. M. Pierce.....	".....	Department Natural Resources, C. P. Ry. Co.
Wm. Pearce.....	Calgary.....	Board of Trade.
Arthur Perry.....	Cardston.....	
Wm. Parry.....	North Wales.....	
W. H. Quail.....	Claresholm.....	
Norman S. Rankin.....	Calgary.....	Permanent Secretary.
H. J. Russell.....	Winnipeg.....	Reporter.
T. E. Robinson.....	Calgary.....	Canadian Secretary of Civil Engineers.
W. C. Ricardo.....	Vernon.....	Vice-President, W. C. I. A.
Dr. J. G. Rutherford.....	Calgary.....	Department Natural Resources, C. P. Ry. Co.
J. C. Reddy.....	Victoria.....	Department of Agriculture.
L. M. Roberts.....	High River.....	Board of Trade.
K. N. Robins.....	".....	do
Prof. A. H. D. Ross.....	Calgary.....	A. R. & I. Company.
Dr. V. H. Rivers.....	Lethbridge.....	
R. Renkenberger.....	Barrons.....	
W. J. Stephen.....	Claresholm.....	Principal Agricultural School.
P. M. Sauder.....	Calgary.....	Department of Interior.
Hon. A. L. Sifton.....	Edmonton.....	Premier of Alberta.
R. C. Spitzer.....	Calgary.....	Department of Interior.
R. S. Stockton.....	Strathmore.....	Department Natural Resources, C. P. Ry. Co.
H. J. H. Keith.....	Lethbridge.....	City.
H. A. Suggest.....	Coaldale.....	Board of Trade.
W. W. Thompson.....	Regina.....	Saskatchewan Government.
J. B. Tracy.....	Lethbridge.....	City Commissioner.
S. W. Taylor, Jr.....	Victoria.....	Board of Trade.
L. P. Thornton.....	Portland, Ore.....	Department Natural Resources, C. P. Ry. Co.
N. Taitinger.....	Claresholm.....	Board of Trade.
L. E. Thompson.....	Vancouver.....	Canadian Hess Flume Co.
T. Verburd.....	Coutts.....	
L. W. Wheatley.....	Calgary.....	
R. G. Williamson.....	Cypress Hills.....	Water Users Association.
I. H. Williams.....	".....	do do
W. F. Wright.....	".....	Agricultural Association.
G. H. Whyte.....	Calgary.....	Department of Interior.
G. D. D. Walters.....	".....	do do
James White.....	Ottawa.....	Secretary, Commission of Conservation.
R. A. Wallace.....	High River.....	Mayor.
W. H. Wilson.....	Calgary.....	Secretary, Board of Trade.
D. J. Whitney.....	Lethbridge.....	Agricultural Society.
L. W. Welaforde.....	Medicine Hat.....	Southern Alberta Land Co.
F. A. Wallace.....	Gleichen.....	do do
K. A. Weir.....	Calgary.....	Farm and Ranch Review.
J. E. Wodell.....	Lethbridge.....	Editor, News.
Wm. Young.....	Victoria.....	Department of Lands, British Columbia.
Thos. Wardrope.....	Leeds, N.D.....	



Some of the delegates at the Lethbridge Convention.

CHAIRMAN.—We will now take up the question of fixing the next place for holding the convention of the Western Canada Irrigation Association. In this connection, I believe the secretary would like to read some communications.

Mr. RANKIN.—I read from the record of the meeting at Kelowna last year, which says: 'Mr. E. Foley-Bennett, President of the Penticton Board of Trade, announced that Penticton would endeavour to secure the convention in 1914, while Mr. R. C. Pegler, President of the Bassano Board of Trade, stated that Bassano would like to see the convention held at that point in 1915,' and we have with us Mr. Bennett and his delegation.

I have a letter from the Board of Trade of Kamloops, as follows:—

KAMLOOPS, B.C., July 31, 1913.

DEAR SIR,—On behalf of the Board of Trade of this city, we wish to extend to the officers and delegates of the Western Canada Irrigation Association a most cordial invitation to hold next year's convention at Kamloops, when we can assure them that everything will be done to make the convention a success and also an enjoyable visit for all who may attend.

Hoping we may have the honour and pleasure of their presence here, we are, dear sir,

Yours very truly,

JAMES A. GILL,
President.

HENRY T. DENISON,
Secretary.

I have a further letter from the Corporation of the City of Kamloops, which reads as follows:—

KAMLOOPS, B.C., July 31, 1913.

To the President, Secretary and Members of the
Western Canada Irrigation Association,
in Convention assembled, Lethbridge, Alta.

GENTLEMEN,—The city of Kamloops sends greetings and best wishes for a very successful meeting.

On behalf of the City Council, I most cordially invite your honourable body to Kamloops as your place of meeting for the year 1914.

In doing so, I know I bespeak the wishes not only of our council but of our people generally, and can assure you should you honour our city by your presence in convention in 1914, this city will heartily welcome you and use our best endeavours to make your stay with us pleasant and profitable.

I am, yours very truly,

J. T. ROBINSON,
Mayor.

In this connection you will remember that a resolution has been put in the hands of Mr. Pearce requesting that Maple Creek be considered for the convention in 1915, but this will be dealt with next year.

The following letter has been received from the Bassano Board of Trade:—

The President,
Western Canada Irrigation Association,
Lethbridge, Alta.

BASSANO, ALTA., August 4, 1913.

DEAR SIR,—On behalf of the Executive of the Bassano Board of Trade, I hereby extend a hearty invitation to yourself and association to hold your irrigation convention at Bassano in the year 1915.

Yours respectfully,

ARTHUR G. BOND,
Secretary.

Mr. PEARCE.—Before the advocates for the convention speak, I would like to ask if it is to be decided by open voting or by ballots. If by ballot, preparation should be made now.

CHAIRMAN.—The voting is by ballot.

Mr. PEARCE.—Then I would suggest that you nominate two gentlemen to prepare the ballots.

CHAIRMAN.—I would name Mr. Fairfield and Mr. Elliott. Neither of these gentlemen are living in the province where the convention is to be held, otherwise I am afraid they might stuff the ballot box. (Laughter.)

Addresses on behalf of their respective points were then made by Mr. V. D. Curry, Kamloops, Mr. E. Foley-Bennett, Penticton, Mr. J. L. Brown, Kamloops, and Mr. J. C. Dufresne, Penticton.

CHAIRMAN.—Any further nominations? If not, I declare them closed. The delegates have been supplied with ballots, and will write the names, Kamloops or Penticton, the places proposed, as they desire.

CHAIRMAN.—The result of the ballot is, Penticton 28, Kamloops 21. It is, therefore, decided that this convention when it adjourns, adjourns to hold its next annual meeting in Penticton, British Columbia.

THURSDAY AFTERNOON SESSION.

CHAIRMAN.—Now, ladies and gentlemen, we are ready to resume the work of the convention. I would like to inform the delegates that the standard certificates have been signed and are in the hands of the assistant to the secretary, at the door. Kindly see that you get them back as you leave. We are now ready to proceed with the election of officers for 1913-14.

The following officers were elected:—

Hon. President—Hon. W. J. Roche, Minister of the Interior.

President—Hon. W. R. Ross, Minister of Lands for the Province of British Columbia.

Vice-President and Chairman of the Executive—J. S. Dennis, Assistant to the President, Canadian Pacific Railway.

Second Vice-President—W. H. Fairfield, Superintendent, Dominion Experimental Farm, Lethbridge.

EXECUTIVE.

J. C. Dufresne, Vernon, B.C.

Dr. C. W. Dickson, Kelowna, B.C.

E. Foley-Bennett, Penticton, B.C.

F. J. Fulton, Kamloops, B.C.

D. W. Hays, Medicine Hat, Alta.

William Pearce, Calgary, Alta.

F. H. Peters, Calgary, Alta.

W. X. Wright, Battle Creek, Sask.

Permanent Secretary—Norman S. Rankin, Calgary, Alta.

CHAIRMAN.—We have now elected the officers for the ensuing year. I have only one regret and that is that the president is not here in order that I might have an opportunity of turning over to him the task of presiding at this meeting for the balance of the session, as I unfortunately have to leave for home inside of half an hour, as I have a call to be at Stony Plain to-morrow afternoon. However, if we have not got our president, we have a very good substitute in the shape of the second vice-president, Mr. Fairfield, whom I will ask to preside. (Applause.)

Mr. FAIRFIELD.—Ladies and gentlemen, this is an unexpected honour for me. Before we go on with our regular programme, we are going to ask Mr. Marshall to say a few words to us before leaving.

Hon. Mr. MARSHALL.—Mr. Chairman, ladies and gentlemen, I have no thought of burdening you with a speech, but just before I leave I would like to express the satisfaction it has given me to attend this annual meeting of the Western Canada Irrigation Association. As I said at the opening of the convention, my department has nothing to do with the making or the administration of the laws in connection with irrigation, consequently I am not brought into as close a touch with irrigators as I otherwise might be. However, the department, as Professor Eliott has said, recognizes the fact that farming by water must play no small part in the future agricultural development of this province, and so far as the Provincial Agricultural Department is concerned, we shall endeavour to give every possible legitimate assistance to the man who is endeavouring to make a living on the land.

We have had a good meeting this year; there have been some splendid addresses here (applause), and one feature of the majority of the addresses I may say, has been that they have been of a practical nature, and I hope it will be the aim of the executive, and I believe it will be, of this association to keep the programme of future meetings along these lines. If conventions of this kind, or of any kind, are to be of any permanent value in this country, they have got to touch the man who is trying to make a living for himself on the land. (Applause.) It is all right to tell the farmer he is the back-bone of the country, nature's nobleman, the horny-handed son of toil and the only free and independent man in the world, but the fact remains that the man who is endeavouring to make a living on a piece of land, to keep a family, to pay the hired men, and to put something by, has a difficult position to fill, and it has been a discouraging business in Alberta, where money is so easily made out of speculation, for men who have put money into farm lands and have worked

very hard, and have perhaps had less return. It seems to me that the difficulty is that there are too many things between the tiller of the soil and the ultimate consumer. Our markets are far too far apart. Organizations of this kind should get at the root of the matter and devise some means by which the farmers in this country can be guaranteed a legitimate market, because if we are going to keep the boys on the farm we have got to show them that farming is not only a pleasant but a profitable occupation.

Now the reason I started—and I am not going to discuss our policy—the reason I started the Demonstration Farms in this province is that I wanted the men in my department to get in touch with every phase of agriculture, and we are endeavouring to work these farms as any first-class farmer would operate them and see whether or not we cannot work out the problem of marketing the produce of the farm and make



Some of the ladies attending Lethbridge Convention.

money, and if these farms never do anything but bring us in close, practical touch with the man on the land, then they have accomplished something of great value. (Applause.)

It is all right to preach and talk scientific theories but they are no good unless they can be worked out on somebody's farm. I tell a little story sometimes—as a boy I never missed an agricultural meeting near our farm, and I figured out then that the difficulty with our agricultural colleges—and they have done a great deal of good—but the thing that ailed them was that they were largely educational institutions they were training boys for some other occupation than farming. I remember a young fellow who had been at the head of his class in Guelph Agricultural College that year. He had passed every examination. Why? Because he was a B.A. of Toronto University before he came in. He came to our neighbourhood to talk to the farmers about feeding, and I was born in a township that raised more cattle every

spring than any other part of Ontario, and when I heard him tell the farmers that turnips had practically no food value, I wondered what was going to happen to him. He explained why, and I saw an old farmer at the back of the hall begin to pull his whiskers. He said they had no food value because he had conducted a chemical analysis which showed that they were ninety-seven per cent water, and the old man could contain himself no longer and he said, 'Yes, my boy, but it's damned good water.' (Laughter.) That fellow missed his business because he knew nothing about the practical end, consequently the chemical analysis did not teach him very much about it. We must make this association a practical institution. I was very glad indeed that this association recognized the importance of live stock and had Mr. McMullen, one of the most competent men in Alberta, deliver a splendid address on live stock. (Applause.) There is no question about the fact that if we are going to make agriculture a success, we have got to get cows and got to get milk cows; that is the secret of the whole business. Now, feeding beef steers is a good business, but there is not anything that will bring in the money every day, every week and every month, like the old cow, and I know on my own farms and on the demonstration farms we would have to throw up our hands if we were not milking cows every day. Live stock on the farm is the secret of the success of agriculture, and I think this convention cannot do anything better than by having Mr. McMullen and Dr. Rutherford address them again next year. The secret of keeping the boys on the farm is the getting of live stock on the farm. There is not much human interest in digging a ditch or raising a field of wheat, but there never was a boy in the world who did not have a live interest in live stock. My two boys have a pony a piece and my boy five years old can harness a pony and hitch him up to the buggy, and you will find that the boys on the farm in this province will stay there if they are given an interest in the stock. If you have live stock, give the boy a chance to raise a calf for himself and when it is two or three years old don't sell it and put the money in your own bank account. (Laughter.) That has driven more boys off the farm than anything else I know. The calf is sick, and you say, 'Johnny, pull it through,' and Johnny sits up all night and pulls it through, and when it is two years old it is bigger than others at three years old, proving that feeding is half the breeding; and the buyer comes around and gets his eye on it and offers a big price for it, and you take it and even ask Johnny to drive it to town, and you deposit the money directly to your own credit, and Johnny says, 'If that is farming, I want to get out of it and get out of it quick.'

Talk about 'you can't get men.' You can't get men to milk some kind of cows, but you never saw the man or boy yet that sat down to milk a cow giving thirty, forty, fifty pounds of milk but got interested and said, 'Old bossy, you are worth your keep,' and then sat down by the side of some old rip and milked for two hours and got a cupful and cursed the whole business and everything belonging to it. We have twenty-two cows on the farm at Olds that have averaged over one hundred pounds apiece. We have a herd of Holstein cows at Vermilion and six of these have given on tests a wonderfully high percentage of butter fat. These are cows worth having and anybody can get them as we got them—by selection. We have no trouble in getting men to milk these cows on these farms. I believe if some of these fellows had their bed in the box stall they would stay there. We have a competition on

among the farmers and they are making records. We have a competition among the boys. We are giving three prizes for the best pure-bred young stock, and it will encourage the boys to find out whether the stock on their fathers' farms is any good or not, and in this kind of work we are getting the assistance and co-operation of every organization of this kind. I was very glad to be present at this meeting, because the whole trend of the discussion in this gathering during the last two or three days has been along the lines of practical agriculture. There have been other intellectual feasts we had here, which we appreciated very much, but there has been a preponderance of addresses dealing with the practical business of farming, and that is the thing after all that we want to get after, and when this organization comes back here I hope its programme will be as practical as it was on this occasion, because I stand prepared—as long as I have the good fortune to be, and you have the misfortune to have me, Minister of Agriculture—I stand prepared to take all practical suggestions along the lines of educational improvement in agriculture. So far as bonusing farmers to do things is concerned, I never had anything to do with that and never will. Dr. Rutherford was quite right in his expression the other day. If these things cannot be made to pay on their own merits, they should be abandoned, but if this financial stringency, as it is commonly called, lasts for any length of time, the farmers in this province to-day will be face to face with a crisis, and must avail themselves of every opportunity of acquiring information concerning the best possible methods of production and most accessible and most profitable markets. And if we are going to induce the boys to go on the land, there is no finer occupation in the world than farming and no finer farming than live stock farming. It appeals to the best interests in a man. Go with me to a meeting of the live stock men and I will introduce you to the finest company of men you can meet. They are the kings of the country. I have a good deal of sympathy for the man who has no interest in, and very little knowledge of, live stock. That is what made it possible for the men in Great Britain to do what they have done. They would have been driven into the North sea off that country and drowned or starved long ago if they had not produced such enormous quantities of live stock. Our organizations must assist the farmers in better production, cheaper production and more profitable markets, if we are going to place the farmer in the position he ought to occupy; and you have got to be able to show the boy that there are lines of agriculture out of which he can make money and put some in the bank, so that when he reaches an old age he can sit down on the farm and hire men to do the work, and enjoy himself. If you cannot do that then you are going to destroy any fascination that agriculture should have for the young man in this country. That is the problem.

Now, Mr. Chairman, ladies and gentlemen, I had no notion of talking at this length when I began, but for the last two or three years I have been intimately connected with the Department of Agriculture in this province in connection with the establishment of our farms and the marketing of produce, and I have seen so many discouragements that I think the first business of any form of organization is to endeavour to alleviate some of these. I hope, if nothing happens, to be able to meet with the good people of British Columbia next year and to welcome you back subsequently to the province of Alberta or perhaps with our friends from Saskatchewan. However, that would only be across the boundary a little way. I thank you, not only

for your patient and indulgent hearing of these rambling remarks, but for your attendance, your business-like manner and the splendid programme you have assisted in carrying out, and for the very satisfactory results you have achieved, and I will bid you good afternoon. (Applause.)

Mr. E. FOLEY-BENNETT.—Mr. Chairman, before our retiring president disappears, I would like the privilege of moving a sincere and hearty vote of thanks for the courteous manner in which he has conducted this convention. It gives me a special pleasure for the reason that our retiring president has conferred one of the greatest honours this association can confer on Penticton, by announcing that the convention of 1914 is to be held in our town. No words of mine are necessary to illustrate his qualifications, as those are evident to everyone.

Mr. BROWN.—I take much pleasure in seconding that, Mr. President, for the impartial manner in which he has conducted the business of this association.

Mr. LAWRENCE.—Will you allow me to follow my leader? I would like to say the address I have just listened to seems to be a very fitting close to his labours with us. I regret there was not a phonograph on that table that he could have spoken into so that we could have the speech repeated verbatim in British Columbia.

Mr. E. FOLEY-BENNETT.—May I ask for a standing vote.

A unanimous standing vote of thanks was thereupon tendered to the Hon. Mr. Marshall, accompanied by cheers and the singing of 'For He's a Jolly Good Fellow.'

Mr. FAIRFIELD.—If the change in chairman is responsible for the speech Mr. Marshall has just delivered, I am sure we all ought to feel very grateful.

Hon. Mr. MARSHALL.—Mr. Chairman and gentlemen, I will not inflict another speech upon you but will just thank you for thanking me. Let me tell a little water story. A man was tramping along the dusty street of a hot country. He had walked twenty miles and was exceedingly thirsty, when he saw a nicely-painted pump with a tin cup on the handle. He started to pump but no water came. He pumped harder and the perspiration rolled off, but just a few drips of water appeared. Still he pumped, when a man who lived in the town said to him, 'What are you trying to do?'

He said, 'I am trying to get a drink.'

'Why, do you know what you are doing?'

'No.'

'Well, you are pumping that fellow's tank full up in his attic.' (Laughter.) That seems to me to illustrate the position of the farmer in this country sometimes.

Mr. FAIRFIELD.—The next item on the programme is an address by Mr. John H. Lewis, State Engineer of Oregon, Salem, Oregon.

IRRIGATION IN OREGON.

Mr. JOHN H. LEWIS.—Mr. President, ladies and gentlemen, in the state of Oregon, we have but recently passed from the pioneer stage of irrigation development to the more complicated stage of expensive works, shortage in water, and numerous controversies. With only seven people to the square mile (over 500 to the square mile in one county) it is apparent that there is yet much room for development. We expect in the near future to reach that stage of irrigation development where the ordinary summer flow of our streams will be augmented many fold through the release of stored water, as is the case in a number of the older irrigation states.

This transition from the pioneer period of unregulated diversions to that of strict public control of all diversions is not easy of accomplishment. The entire thought and life of the water user must be adjusted to the new order. He must abandon the indefinite miner's inch and think of water in second-feet and acre-feet. He must respect public and private rights to water and suffer the penalty for violating law. Until the water user, the courts, and public generally understand the reasons for each feature of the new system, and appreciate the general benefits to be derived from a strict enforcement of its provisions, it will be difficult for the administrative officers to attain the best results.

THE NEED OF IRRIGATION.

Irrigation is necessary in eastern and southern Oregon, but until recently has not been considered necessary in the northwestern, or more densely populated section of the state. The annual precipitation is unevenly distributed, as illustrated by the government record at Glenora, 135 inches; Portland, 45 inches; Government Camp, 90 inches; The Dalles, 15 inches; and Umatilla, 8 inches; each point being approximately fifty miles east of the one preceding.

In the extensive, fertile Willamette Valley only three inches out of a total of 45 inches fall during the summer months, while about 20 inches fall during the winter months. Already several irrigation projects are being constructed with a view to supplement this summer deficiency.

Throughout much of central Oregon, which ranges in elevation from three to four thousand feet above sea-level, the precipitation varies from about eight to fifteen inches. This district, which has long been famous as the largest in the United States without railway transportation, is now being rapidly settled, due in part to the active railway construction which is actively under way, to the reduction from five to three years' residence required for homestead entry, to the increase from 160 to 320 acres allowed to dry farm entrymen, and primarily to the fact that the precipitation in this vast empire is believed to be ample for dry-farming purposes.

PUBLIC AROUSED.

With only 686,129 acres of land irrigated out of a total of 61,200,000 and with possibilities for the ultimate irrigation of about 4,000,000 acres, the public has become aroused to the importance of irrigation development in Oregon. It is apparent that

from six to ten times the population can be supported on irrigated lands in comparison with an equal dry-farming area. As the land to be irrigated is well scattered throughout the dry-farming and grazing districts, it is also apparent that the value of such lands will be somewhat enhanced through the irrigation of adjoining tracts.

The courts are becoming educated to the value of water and are now less willing than formerly to grant extravagant claims in water adjudications. If twice the amount of water necessary to produce crops is allowed, it is readily apparent that the ultimate area to be irrigated will be reduced approximately one-half. The evils of over irrigation are apparent on every hand. For these reasons the public is vitally concerned as to the duty of water. Public funds have accordingly been appropriated for the making of accurate stream measurements extending over long series of years, for the making of topographic surveys and river profiles, and for determining the quality of the public waters. There is thus a general awakening among all classes as to the importance of irrigation.

VALUE OF WATER.

The value of dry-farming lands ranges from about \$5 to \$30 per acre. Irrigated, this land would sell from \$40 to \$100 or more per acre. Improved irrigated land has been known to sell at from \$500 to \$1,000 per acre and over. Water has, therefore, considerable value, and water rights and titles are now receiving careful consideration. In some sections one cubic foot per second of water, flowing continuously during the irrigation season, is estimated to be worth approximately \$10,000.

The cost of irrigation works has increased from \$5 per acre in 1900 to an average of \$15 in 1910, according to the government census, and systems are now planned or are under construction estimated to cost \$40 to \$100 per acre. The amount of water and record evidence of water titles are, therefore, important matters, which are now given serious consideration by the investor, the water user and the public.

WATER LAWS.

In 1909, Oregon adopted a water law which is similar in many respects to that now in force in the province of British Columbia. It has in general been found satisfactory to both the water user and the prospective investor, and is not burdensome to the public, as the fees, collected and paid into the State Treasury have gone far towards meeting the appropriations for its maintenance.

The law deals primarily with (1) the adjudication and recording of rights to water which were initiated prior to its adoption; (2) the granting of new rights, after proper application and record; and (3) the protection of all recorded rights, as well as of the public interest in unappropriated waters. Its administration is in the hands of the state engineer and the superintendents of the two water divisions into which the state has been divided, each of whom has special duties to perform. All important grants or decisions are made by these officers sitting as a board.

This law declares all water within the state to be the property of the public, and makes beneficial use the basis of rights to its use. In the water right certificate, which is record evidence of title, this basis is qualified by a definite statement as to

(1) the priority, (2) the purpose, (3) the period, (4) and the place of use of water, also by (5) the maximum rate of flow or quantity of water. Such certificate gives also the name and address of the owner of the right, and the stream from which the water is diverted.

Owing to the peculiarities of climate and soil, and to the necessity for diverting water for irrigation and other uses, the strict common law doctrine of riparian rights established by early court decisions has been so modified in recent cases that only the faintest shadow of this conflicting doctrine remains to cloud the horizon of the investor in water projects. In some of our states the common law doctrine still prevails in modified form and is a serious handicap to the adoption of modern administrative water codes. The Canadian provinces should be congratulated upon the freedom with which they can adopt laws suited to their conditions, without a long period of turmoil and expensive litigation by those who wish for some personal or financial benefit, to have the stream flow undiminished to the ocean.

ADMINISTRATIVE PROBLEMS.

Although our water code has been in effect four years, we are just reaching the point where its practical operation can be observed by the irrigator. All rights to water on a number of streams have been adjudicated and recorded, and watermasters have been in charge of distribution. These watermasters are appointed by the Water Board, but are paid by the county court. They are thus not as responsive to orders of the superintendent and the board as if paid directly by such board, and subject to dismissal for cause. Another difficulty has been the requirement of the law that watermasters should be residents of the districts from which they are appointed. This prevents the promotion of experienced men to the more complicated districts. Until our law makers, and the public generally come to realize the fact, that the distribution of water from public streams, is as important and complicated a task as operating a railway system, we cannot hope to attain the best results. A highly trained, closely knit organization is necessary, with telephone communication along the stream and other necessary equipment.

In defining water rights in Oregon, the Water Board has generally specified a particular rate of flow for a definite irrigation season. Where the amount of water thus decreed was too small to furnish an adequate irrigation head, rotation was authorized. In this way each man could at any time ascertain whether or not his neighbour was taking more than his share. In case of rotation among a group of neighbours, the total quantity of water used by any one should not exceed the sum of that allotted to each. Self interest will cause each man in such rotation group to see that he gets the total quantity of water his full share of the time. Such a decree is almost self executing, as the average water user is honest and will not take more than he is entitled to, if he knows the water supply is not sufficient for all. In Wyoming, where they have had long experience in distributing water, it is the exception rather than the rule to call out the watermaster to administer such decrees.

For old rights, one cubic foot per second is usually allowed for sixty to eighty acres, depending upon local conditions. All new grants for irrigation purposes have been restricted to the rate of one cubic foot per second to eighty acres. In these cases no right becomes vested until after the issuance of the permit,

and it has been impossible so far for prospective water users to show that more than this amount of water can be beneficially used. The average irrigation season, or time between the last killing frost in the spring and first in the fall, has been carefully estimated from official records, at 120 days. The above rate of flow will, therefore, deliver during such period three acre-feet of water on each acre of land. This in general is sufficient for alfalfa, the ordinary crop requiring the greatest amount of water.

Much difficulty is encountered in defining and protecting rights on flood water streams. On such the floods run off early in the spring, leaving the stream practically dry during the summer months. Rather than build expensive reservoirs, the pioneer settlers flooded their lands by means of ditches or temporary diversion dams, thus storing water in the soil itself. In most cases but one crop of wild hay yielding but one ton to the acre is produced, but under the most favourable conditions one or two cuttings of alfalfa have been produced.

On such flood water streams a larger rate of flow is allowed and the total volume of water per season limited to 1.5 to 4 acre-feet. Under the acre-foot system of defining rights, the watermaster must measure each ditch one or more times each day, in order to even approximate the volume used. More watermasters must, therefore, be employed under this system. Furthermore, each settler must keep a similar record in order to check the watermaster, and no water user could hope to check the amount used by his neighbours, in case favouritism by the watermaster is suspected. It would, therefore, be extremely difficult to convict one of stealing water, and the watermaster would have to be on the job throughout the irrigation season whether controversies existed or not. Otherwise, his record would be incomplete.

Such system of defining water in acre-feet is more suited to large canal systems, where numerous ditch riders are necessary to distribute the water, and where but little additional expense would be entailed in keeping accurate ditch records of the volume of water used each day. It is especially suited to projects or streams where ample storage facilities are available, and where the canals have been constructed with considerable excess capacity, in anticipation of many calling for water at the same time.

NEW MEASURING DEVICE.

Until recently, no cheap and accurate device for measuring water in open channels was available. If the claims for the Dethridge meter are substantiated in actual practice, one of the most difficult problems confronting the irrigator will have been solved.

This meter was invented by Mr. Dethridge, Chief Engineer for the Rivers and Water Supply Commission of Victoria, Australia. It consists of a metal drum about 2 feet 4 inches in diameter, having attached V-shaped metal blades 10 inches in length, which drum revolves in a reinforced concrete flume about $2\frac{1}{2}$ feet in width. The bottom of this flume is concave to fit the revolving wheel and about one-fourth inch clearance is allowed on sides and bottom. Each pocket between these projecting blades must be filled with water before the wheel revolves, and the automatic recording device attached to the axle of the drum indicates the amount of water up to five second-feet within one per cent of the actual discharge. For such amount

the loss of head in the canal is about four inches. This wheel has been tested for two years in Australia, and recent tests at the University of California indicate even better results than expected. Leaves and trash will pass through without difficulty. Two thousand of these wheels have been ordered recently for a project in New South Wales, at a cost of \$13 each. The estimated cost of the meter installed, is \$40, according to Mr. H. G. Tolley. Ample storage is provided on this project and water is sold at \$1.15 per acre-foot to promote economy. One of these meters will be installed at the edge of each irrigated tract to measure the water upon the same principle that water is sold by meter measurement in cities.

IRRIGATION BY PUMPING.

Gravity irrigation under large ditch systems did not become a complete success until the common carrier canal was abolished, and water was made by law appur-



Dethbridge's Water Meter, Irrigation Area, Victoria, Australia.

tenant to the land. Those planning to pump water have not forgotten the early experiences of the water user under such canals where the charge for water, after the expiration of the original short time contract, was increased by the company in accordance with the settler's ability to pay. It is believed that pumping for irrigation purposes will not reach its fullest development until both the power and the water are made appurtenant to the land benefited, either through district or state ownership and distribution of power.

This question is of particular interest to Oregon for the reason that we have a considerable area which cannot be economically supplied by gravity canals, but which may be irrigated by pumping from adjoining streams or from underground sources.

Along Snake river, in eastern Oregon, a pumping plant was recently installed for the irrigation of 6,200 acres where the lift was over 101 feet, at a cost of \$16 per acre, including 6,300 feet of five-foot wood stave pipe and 22 miles of main canal. An irrigation district has been formed for the irrigation of 20,000 acres adjoining the above project where the lift will be 200 to 300 feet, and the land about 2,300 feet above sea-level.

In central Oregon there are great interior basins, each containing several hundred thousand acres of level land, where the annual precipitation does not exceed the evaporation. In most of these basins a limited supply of water is found from 20 to 40 feet below the surface. With a permanent supply of cheap power this water could be pumped for at least partial irrigation of these districts.

PUBLIC INTEREST.

It is the duty of the state engineer to refer to the State Water Board any application wherein the proposed use conflicts with determined rights, or is a menace to the safety or the welfare of the public. This board can direct the refusal of such application after full hearing, if public interest demands. This feature of the law has recently been upheld by our Supreme Court (*Cookinghan vs. Lewis*, 114 Pac. 88), and marks a distinct advance in water legislation.

In Oregon we have a number of large tracts upon which water can be diverted at reasonable cost. Unfortunately the early settlement in these districts has occurred along the streams, and there is a strong natural tendency to complicate and delay the construction of the larger projects through the construction of power plants in the stream channels, or the building of railway lines through available storage basins. If the entire stream basin were owned by an individual, he would compel the power plants to locate a few miles distant on some tributary of the stream where the water could be used for irrigation after passing through the power wheels, although such construction would be perhaps a little more expensive. He would also compel the railroads to locate their lines around and above feasible power and reservoir sites, in order that the large projects which must be eventually built will not be unnecessarily encumbered, and their construction correspondingly delayed.

The state is endeavouring to look somewhat to the future in these matters, as indicated by the above authority granted to its administrative officers for the protection of the public interest.

PUBLIC INVESTIGATIONS.

Recently a further step in this direction was taken by our legislature. The sum of \$50,000 was appropriated for the making of detailed plans and estimates of cost of a number of these projects, and authorizes co-operation with the United States. The government has allotted an equal amount from the Reclamation Fund and the investigations are now being carried on jointly. The necessary land and water rights are withdrawn so as to prevent further complications, and it is the intent to assign such plans and rights to the people forming themselves as a district for the construc-

tion of the project, or to private capital, who will undertake to carry out the public plans on terms satisfactory to the people. Failing in this, the legislature has submitted a constitutional amendment for vote of the people in 1914, authorizing the issuance of bonds equal to two per cent of the assessed valuation of the state for the construction of irrigation and power projects, and for developing the cut over timber and other lands of the state.

In other words, the state is now authorized to make water filings, and to gather all necessary information relative to these large irrigation and power projects, which may be necessary in promoting their construction by either private or public funds. It has also taken the first step looking towards construction with public funds if such action is found necessary.

WILD CAT IRRIGATION.

The 'Wild Cat' irrigation project has seriously retarded development in the West. The financier has become sceptical of all irrigation projects, and the settler without the ability or means to investigate every feature of a complicated project, refuses to invest. Those who have purchased dry ditches write letters warning their friends against western investments. A few such failures can easily offset an expensive development campaign.

The western people are responsible for these conditions and not the administrative officers. Some of our states have not as yet undertaken public supervision of their water resources, others refuse to give their administrative officers the necessary power to deal with the situation effectively, and all refuse to make adequate appropriations for stream measurements and records of water supply, so that the situation could be handled if the laws were adequate.

If a public officer insists on delay while he is securing water supply records, he is accused of blocking progress by red tape methods. Not even the land owners in whose interest he is labouring will support his action. It is generally assumed that an engineer should be able to measure the water in a stream, and make a complicated water supply report in about the same time and for about the same cost as for a land survey.

For an expensive project where it is planned to utilize practically all the surplus waters of a stream, daily records for a period of ten years are sometimes insufficient as a basis for an accurate estimate of the available supply.

The remedy for the 'wild cat' evil lies first in more liberal appropriations for stream gauging work; second, more authority for the administrative officers in passing upon questions of water supply, cost and financial ability, before allowing a large project to proceed; and third, stronger support by the people benefited in case a project is turned down.

Water is of more value than land in the West. It is highly important that the people be aroused to the value of public water surveys, and the necessity of securing more complete information as to the duty of water. (Applause.)

Mr. FAIRFIELD.—Is there any discussion on this paper?

Mr. DRAKE.—I have been very much interested in this address, but there was one statement Mr. Lewis made which possibly I did not understand. I understood

him to say that the estimated value of one cubic foot per second of water during the irrigation season had been fixed at \$10,000. A little later he said that quantity of water was sufficient under the present law for eighty acres, which would make a water right worth \$125 per acre. If that is so, I would like to ask what kind of crops are grown?

Mr. LEWIS.—That is considered a maximum value of water. The cultivation is highly intensive.

Mr. KELLY.—I have a photograph of the water meter referred to, and would be pleased to let the engineers present see it, if they desire.

Mr. FAIRFIELD.—If there is no further discussion, we will ask the chairman of the the Committee on Resolutions to submit his final report.

Mr. PEARCE.—Mr. Chairman, ladies and gentlemen, the following resolutions have since been placed in the hands of the Committee on Resolutions. I think it would be just as well that I read them and leave it to someone in the audience to move and second their adoption.

RESOLUTION No. 4.

Moved by W. H. Moody, seconded by Walter Huckvale, with the special request that the secretary have the same engrossed and framed and sent to the Chief of the Fire Department of the City of Lethbridge:

Resolved, that the delegates to the Seventh Annual Convention of the Western Canada Irrigation Association hereby express their appreciative thanks to the members of the Fire Department of the City of Lethbridge, who, under the direction of Fire Chief William Hardy, gave as a feature of our entertainment an excellent drill in front of the Majestic Theatre on Tuesday noon, August 5, and that we compliment them on their agility and ability, and further compliment the city of Lethbridge upon having such up-to-date apparatus so efficiently handled.

CHAIRMAN.—You have heard the resolution. Carried.

RESOLUTION No. 5.

Moved by Mr. Nicholson, seconded by Mr. Gregg:

Resolved, that the delegates of the Seventh Annual Convention of the Western Canada Irrigation Association do hereby, on parting, express their sincere thanks for the admirable entertainment and the appreciable hospitality that has been extended to them during their stay in the city of Lethbridge.

Resolved, that our thanks are hereby extended to the Local Committee of Arrangements for the efficient manner in which they arranged and saw to the comfort and welfare and the entertainment and welfare of all visitors and delegates.

Resolved, that the thanks of this convention are hereby extended to His Worship Mayor W. D. L. Hardie and the members of the City Council, and to President W. C. Ives, Chairman Fred. W. Downer and the Executive of the Board of Trade of Lethbridge for their hospitality.

Resolved, that the thanks of this convention are extended to the ladies of St. Cyprian's Church for the excellent luncheon provided the delegates at Ideal Farm, and for their further co-operation by their attendance upon our meetings.

Resolved, that the thanks of this convention are extended to H. E. Miebach, proprietor of the Lethbridge Hotel, for his courtesy in making his house the official headquarters; to Frache Brothers and J. E. Terrill, for flowers and decorations of the theatre; to D. J. Whitney, for his courtesy in the entertainment of the delegates at Ideal Farm; to W. H. Fairfield, Superintendent of the Experimental Farm; to all owners of automobiles for the enjoyable motor trip; to the employees of the Municipal Street Railway, and the police; to the officers and members of the Chinook Club and the Y.M.C.A., for the privileges extended to the delegates, and to the Lethbridge *Herald* and Lethbridge *News* and the citizens generally.

CHAIRMAN.—You have heard the resolution. Carried.

Mr. E. FOLEY-BENNETT.—Mr. Chairman, it has been suggested to the Committee on Credentials that a committee should be appointed to consider the advisability of amending the constitution in regard to the matter of membership and representation, viz., broader representation from the provincial governments especially in regard to the Irrigation Department in British Columbia, and also that it must be specifically stated that all delegates must produce properly authorized credentials, and that the secretary supply all the delegates with printed forms.

Mr. FAIRFIELD.—You have heard the recommendation suggested by the Committee on Credentials. Do you wish to move that a committee be appointed to take action on this and report before the next general meeting? It would be advisable owing to the confusion in the credentials. A great many came here without proper credentials, who probably had a right to them. If you will move that a committee of three be appointed, I will do so.

RESOLUTION No. 6.

Moved by Robert Needham, seconded by J. Brown:

That a committee of three be appointed to look into the matter of revising the membership and representation to the convention, and that this committee report to the executive in sufficient time before the next convention, so that it can be acted on in the usual manner.

Mr. FAIRFIELD.—You have heard the resolution. Carried. I will appoint on this committee, Dr. Dickson, of Kelowna, Mr. E. Foley-Bennett, of Penticton, and William Pearce, of Calgary.

The following address by Dr. Allison Smith, of Medicine Hat, one of the official representatives of the Cypress Hills Water Users' Association, is incorporated in

the proceedings at this point. Mr. Smith was prevented from attending by sickness at the last minute, but as his address is of great practical interest to all students of irrigation, it is included in the report:—

Dr. ALLISON SMITH.—Mr. Chairman, ladies and gentlemen, some seven or eight years ago a few earnest men got together and formed an association which is known to-day as 'The Western Canada Irrigation Association.' It must be a source of gratification to the gentlemen who formed that association as well as those who have, down to the present time, assisted in its growth to note the proportions it has attained.

When I received the invitation extended me by the association to speak here, your secretary, Mr. Rankin, stated in the letter that he wished to get the experience of the actual irrigationist—his successes and his failures—and as I have had something of each, it is with that thought in mind that I appear before you to-day.

Irrigation is a subject which has interested individuals in every nation where food and forage is produced. The Nile Delta might be cited as an irrigation classic, the records of which extend to remotest antiquity. Its fruitful soil saved the lives of the starving Israelites and was for years the granary from which Rome at the height of her power drew her supplies which were distributed free to her people.

Gibbon in his 'Decline and Fall of the Roman Empire' mentions the fact that alfalfa was extensively grown on the plains of Greece, and when that part of the Empire was overrun by barbarians, the latter brought with them their flocks and herds, and their prolonged stay was made possible by the alfalfa growing in that favoured clime.

In order that we may have a prosperous and contented people we must have a generous supply of food. It must be of good quality, sufficient in quantity and cheap enough to be within the reach of everyone in order to bring about the highest development of the race.

Foodstuffs are divided into three classes: proteids, carbohydrates and fats. Proteids are foodstuffs which contain from 15 to 18 per cent of nitrogen, and they enter largely into the development of the muscular, nerve and glandular tissues of the body as well as being present in force in the blood. Proteids also contain the same elements which enter into the formation of carbohydrates and fats but in different chemical combination.

As you are aware, it is impossible for an animal to take into itself substances such as nitrogen and lime salts in their inorganic state and digest and assimilate them. We must then of necessity look for some plant which has in its composition the elements necessary for the production of food, that can be easily and cheaply grown and when fed to an animal be readily assimilated and digested. Alfalfa has proved to be such a plant, and this plant is of vital importance to every man, woman and child in Canada to-day.

It has the power through bacteria attached to its roots to take into itself nitrogen from the air and also store it in the soil. But it can do more than that. Under the influence of solar light and heat it has the power to extract from the earth certain lime salts which enter into the formation of bone, so that we have a plant which when fed to an animal furnishes us with a bony framework, besides giving us the necessary tissues wherewith to clothe it, and from which we derive our steak, chop or cutlet as the case may be. But before we can enjoy that steak we must grow

the alfalfa and feed it, and in order to do that your land must undergo certain preparation.

We assume that your land is of a quality which when sown to grain will, under ordinary circumstances, produce a crop, that it has been surveyed and levelled and of sufficient slope that when water is applied the water will not lie on it and become stagnant, and that any underlying water is not closer than five feet to the surface of the soil.

To get a good stand of alfalfa our method has been to summer-fallow, making sure that all grass and weeds have been disposed of, and by frequent harrowing retain all the moisture possible. The following spring when all danger of frost is over, we drill in one bushel of oats per acre as a nurse crop, inserting it about three inches deep, and on top of that we broadcast our alfalfa seed at the rate of twelve pounds per acre and harrow lightly. If conditions are favourable, the alfalfa should be six inches high before overtaken by the oats. The land on which we grow alfalfa is a heavy clay loam, and a nurse crop does not hurt the alfalfa. The nurse crop besides furnishing a quantity of green feed can be cut with a binder, leaving a stiff stubble to act as a barrier to retain any snow that may fall, and so prevent winter killing.

We have sown the seed with and without a nurse crop, and both methods appeared to be successful until this year, that without a nurse crop winter killing very badly. The seed without a nurse crop was sown at the same time and under the same conditions as that with a nurse crop. We cut the crop when the weeds became strong, using a mower. After cutting twice a dry spell followed, and the growth of alfalfa was retarded. On this piece, winter killing was much in evidence, the snow having blown off, leaving the alfalfa exposed to the elements.

The seed used came from four different places, namely, Colorado, Idaho, Nebraska, and some Turkistan seed from the seed house. They all appeared to do equally well.

If you have any foxtail near your alfalfa field get rid of it if possible, for once it gains a foothold it is almost impossible to get rid of, and eventually it will take possession of your field.

The question is often asked, 'Is it necessary to inoculate alfalfa?' By all means, if alfalfa has not been grown in your neighbourhood, send to your Department of Agriculture for nitro-culture, or your Experimental Farm for earth from an alfalfa field.

Our alfalfa existed for two years without inoculation. Each spring it would make a brave stand for a month or more, and after it had attained a height of six or eight inches it seemed to receive a set-back. It lost its fresh, healthy, green colour and turned sickly and drooped. The following year we sent to Edmonton for nitro-culture and received sufficient for one acre. That nitro-culture worked a miracle. On the part that was treated the plants stood three feet high, strong and robust. The line of demarcation between it and the remainder of the field being as sharply defined as if cut with a knife. The rest of the field we treated with earth taken from that acre, and the results were equally satisfactory.

By sowing twelve pounds per acre the output may be lessened, but the hay is not so coarse as when a less quantity is used. A certain number of plants are killed

every year through frost, mechanical means, &c., so that we prefer it thick rather than thin.

Alfalfa will grow and give a big return any ordinary year without irrigation, but it attains its greatest perfection when supplied with a liberal amount of water—water taken preferably from a reservoir the contents of which have been warmed by the genial rays of Old Sol. But do not give it too much water or you may overdo it. Let me illustrate. It is related in Japan that there is a spring which when bathed in, one sheds the years as one would shed a garment. A lady hearing of it was directed there by a passing shepherd. The next morning on passing the spring the shepherd found a young babe—she had overdone it. Do not put too much water on your alfalfa, otherwise you will retard the growth of your next cutting, and it will possibly kill some of the plants.

Do not let your land become flooded in the winter. Through an oversight, the gate in our dam was left open and a chinook happening at that time, snow water poured into the ditches and on to the land on which a coating of ice formed and killed every plant so covered.

Ordinarily two cuttings for the season may be had with an average of four tons per acre.

Alfalfa is relished by young stock of all kinds, and is especially good for cattle, sheep and pigs. If work horses are fed on it the oat ration should be cut down fully one-half. A convenient though somewhat wasteful way to feed it is to make a V-shaped self-feeder, capable of holding two or three tons. If you have plenty of water and salt in addition to your hay, your stock will come through the winter and be ready for the block in the spring.

The burden of alfalfa growing should not fall altogether on the shoulders of the farmer. On the back part of the lot of the average householder there is often an unsightly and unsanitary piece of ground, which could be made to produce sufficient alfalfa when cured to cause the hens of that man to sing songs of praise, and in the winter to add to his wealth, eggs at the rate of sixty cents the dozen.

If every farmer and stockman in Canada would grow ten acres of alfalfa—and it will grow in every province from the Atlantic to the Pacific—in place of importers, we should be exporters of meats, and add thereby to the country's wealth, besides placing within the reach of everyone cheap and good food. What if there is considerable work in growing alfalfa, and one is tired after a day's work? You arise in the morning from a refreshing sleep; you hear the birds singing, the dew is sparkling on the grass, and as you glance over your fields—fields of living green—you thank your Creator you are alive and that you are growing alfalfa.

Mr. FAIRFIELD.—We now have, as the last address on our programme, quite a treat: an address from Professor A. H. D. Ross, Professor of Forestry in Toronto University.

TREE PLANTING ON PRAIRIE FARMS.

Professor A. H. D. Ross.—Mr. Chairman, ladies and gentlemen, we all love the trees and appreciate the great influence they have in beautifying the landscape and furnishing valuable material for various purposes on the farm. On prairie farms, especially, they are valuable for shelter from the cold winter winds and drifting snow, for fuel, for fencing and for other uses, and I do not believe it would be the slightest exaggeration to state that a good tree plantation on a prairie farm increases its value at least ten per cent. If you are inclined to doubt this statement just imagine yourself looking for a desirable place in southern Alberta, and that one farm with certain improvements is offered to you for \$10,000 but that it is still on the 'bald-headed prairie,' and that another farm with the same amount of improvements plus attractive tree plantations is offered to you for \$11,000, and I will bet you a box of those choice Kelowna cigars Dr. Dickson told us we need not be ashamed to offer to our best friends, that you would be willing to pay the extra \$1,000 for the farm whose owner had had the foresight to improve by planting trees upon it. The æsthetic side of the question appeals to the average man far more strongly than you may at first think, and it is unquestionably good business to have good tree plantations upon farm properties, and especially upon prairie farms.

ADVANTAGES OF WINDBREAKS.

Those who live on the prairie know something of the advantages of a shelter belt of trees, which in summer tempers the hot winds that blow and is of considerable service in preventing the scorching of field crops. Professor King's investigations in Wisconsin show that the evaporation from the soil 320 feet to the leeward of a black oak grove 20 feet high was 27 per cent greater than at a distance of 20 feet from it. This difference often means the difference between a fair crop and none at all—that is, between a small profit and a dead loss of time and money. In this western country investigation along similar lines would probably show even a greater difference because of the greater velocity of the winds and their continuing for days at a time when the young crop requires every ounce of the scant supply of soil moisture.

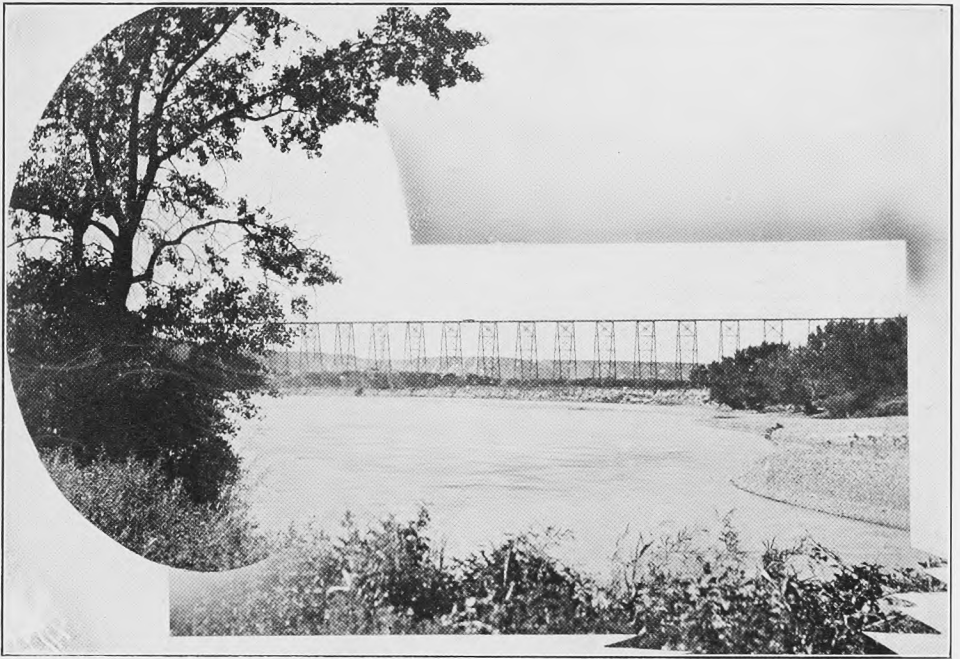
If properly spaced around the buildings on a farm, belts of trees are of great service in breaking the force of the cold winter winds and in holding back drifting snow.

Apart from their usefulness in summer and winter, the trees vastly improve the appearance of a place, and, if planted in solid blocks, furnish considerable quantities of fencing and fuel wood. One of the photos that I have here with me shows a pile containing three and one-half cords of wood cut from an acre of cottonwood grown on the Dominion Forest Nursery Station at Indian Head, Sask., in less than four years, which should be conclusive evidence regarding the practicability of growing fuel wood on the prairie. In this connection I wish to state that seven years ago I inspected a thirty acre block of solid planting, about ten miles southwest of Brandon, Man., which was established in 1903 and has been added to since, and there

is not the slightest doubt that the owner has cut considerable quantities of wood from it since.

GOOD INTENTIONS.

When they begin life on the prairie, most farmers fully intend to do some tree planting on their places for shelter, for ornamentation and for fuel, but, through one cause or another, most of them putting it off from time to time, whereas they might just as well do it at the outset and have the value of their places increasing from the year they take possession of them. A prairie farm with good tree plantations upon it has a threefold advantage over one without them: first, it presents a better appearance; second, it has a higher selling value; and third, it is a much pleasanter place to live while you are making your brief trip across the stage of this mundane



C. P. R. Viaduct over Belly River, Lethbridge.

sphere. In his admirable paper on 'The Work of the International Institute of Agriculture,' Dr. Rutherford drew special attention to the dignity of agricultural pursuits, and we all agree most thoroughly with what he said on that subject, but to dignity would it not be well to add the pleasure of living on a place beautified by the planting of trees and shrubs? Those of us who were so fortunate as to spend yesterday morning at the Dominion Experimental Farm, east of this city, and at the beautiful home of Mr. D. J. Whitney, have some idea of the way in which a place may be beautified by the judicious planting of trees and shrubs.

DIFFICULTIES ENCOUNTERED ON THE PLAINS.

Whilst pointing out the advantages of trees on a place, it must be remembered that there are very real difficulties in the way of growing them on the prairie which

are not encountered in the east. In Ontario, for example, there is an average annual rainfall of 33 inches; in Manitoba, from 22 to 25, and in some parts of Saskatchewan and Alberta as low as 14 or 15. When it is remembered that each inch of rainfall makes a difference of over 113 tons of water per acre, it will be seen how much less soil moisture there is for the trees in the West than there is in the East. In addition to this, the open nature of the country and the high winds prevailing on the plains rob the soil of its moisture content much more rapidly in the prairie provinces than east of the Great Lakes, so the real problem appears to be, 'How can we conserve the moisture present in the soil and render it available for the young trees until they are well enough established to shift for themselves?'

For several years it was considered impossible to grow trees on the plains without irrigation, but twenty years' experience has shown that they may be grown almost anywhere if the problem is studied aright and the necessary precautions are taken to ensure their growth. The pioneer work in this line was carried out on the Dominion Experimental Farm Stations at Brandon and Indian Head, and later on at the Dominion Forest Nursery Station at Indian Head and the Canadian Pacific Railway Forest Nursery Station at Wolseley, Sask. Countless experiments at these points prove that trees may be grown almost anywhere between the Ontario boundary and the base of the Rockies, and the secret of the whole matter lies in, first, the proper preparation of the soil, and second, timely cultivation of the soil until the young trees are able to shade out their competitors for soil moisture. To grow grain crops successfully requires good cultivation and to grow tree crops successfully requires equally good cultivation. In the case of the grain crop, however, the mistakes of one year may be remedied the next, whereas in the case of a tree crop it is essential to get started right or much valuable time is lost and the owner is apt to get discouraged with the undertaking.

TREATMENT OF THE SOIL.

The importance of thoroughly preparing the soil for trees cannot be emphasized too much. If about to establish the plantation on sod land it is advisable to turn over a shallow furrow, say two or three inches deep, before the middle of May. Care should be taken to get the inverted sod to lie as flat as possible, and in some cases it is a good plan to roll it so as to ensure thorough rotting. In about six weeks time it usually becomes quite friable, and should be backset so as to turn up two or three inches more of the soil which has lain undisturbed for centuries, or possibly millions of years, whilst buffalo and other animals have roamed over its surface and compacted it to such an extent that it is quite impossible to grow trees in it until it is thoroughly pulverized and aerated. The same day the soil is backset it should be well worked with a disc or drag harrow, and in some cases with a plunker, to ensure the pulverization of lumpy parts. The discing or harrowing forms a dust blanket which retains the soil moisture and at the same time ensures a good tilth. About the end of September the ground should be ploughed seven or eight inches deep and disced again before leaving it for the winter.

SUMMER FALLOWING.

Where grain or root crops have been growing, summer fallowing is all that is necessary, but it must be done with care on stubble land because undecayed straw

tubes act as so many flues for the escape of moisture. By ploughing the stubble land deeply before the first week in June and harrowing it to form a mulch of fine earth, the moisture will be retained and the stubble thoroughly rotted. In some cases it may even be advisable to use a soil packer for this purpose.

Fall ploughing is the worst imaginable practice, because it generally buries weed seeds in the soil and gives trouble for a long time to come. Referring once again to the subject of weeds, permit me to congratulate our worthy president, the Honourable Minister of Agriculture for this province, upon the decided stand he has taken in supplementing the purely 'educational' method of eliminating the weed nuisance by a thorough system of inspection and the imposition of penalties upon those who flagrantly disregard the law dealing with this vitally important subject. For twenty-seven years I have seen the weeds steadily advancing from the Red river to the Bow river, and I tell you frankly that I also wish to congratulate the farmers of Alberta upon having a Minister of Agriculture who tells them he is going to take a switch to all the refractory pupils in his school.

Returning to the subject of land which has been summer fallowed and is to be planted with trees the following spring, discing or harrowing during the summer will keep down the weeds and conserve moisture in two ways: first, by forming a dust blanket, and second, by preventing the escape of soil moisture by transpiration through the leaves of a vigorous crop of weeds. It is also beneficial in preventing the ripening of weed seeds and the starting of even a greater crop the following year. In the spring the ground may be ploughed again and disced to put it in first-class condition for planting.

CHOICE OF SPECIES.

Many failures of the past were due to a wrong choice of species. The use of eastern and southern grown stock caused some planters to become discouraged, whilst in other cases neglect to prune the roots and branches caused failure. The transplanting of a tree is a serious operation, and a proper balance should be kept between its root system and its branch system. For prairie planting, however, it is cheaper and better to use small trees, where a considerable number is required.

Where quick growing species are desired it has been found that Golden Willow, Red Willow, Laurel-leaved Willow, Cottonwood and Russian poplar give good results. These may all be grown from cuttings, and enough material may be set out for an acre in a comparatively small space.

The Manitoba Maple or Box Elder, the Green Ash and the White Elm have also been found to be hardy in most situations but are slower growing. In some localities with a moderate rainfall they may be grown from seed drilled in where the trees are to stand and thinned out later, but it is generally advisable to grow the seedlings in a regular forest nursery and transplant them when they are a foot or two in height.

HEELING IN.

The seedling trees are taken up in the fall and 'heeled in' until the following spring. This is done by laying them in shallow trenches and covering up all but the tops with earth. If they are to be shipped a considerable distance in the spring

precautions must be taken to prevent their drying out in transit. Packing the roots in wet sphagnum moss and sewing up in burlap is the usual method adopted. If not planted at once they should be again heeled in in a shady place, where they may remain for a few days.

PLANTING ARRANGEMENTS.

In setting out plantations care must be exercised not to have them too close to the buildings or the snow will bank up against the buildings and be a regular nuisance. Usually they should not be closer than 300 feet from the nearest buildings and in most cases it is a good plan to have two belts of trees so the snow will be lodged between them and thus be kept back from the buildings. Usually the first shelter belts are established on the north and west sides of the buildings. If desirable, belts may later on be set out on the east and south sides, but often it would be a mistake to completely shut off a view of the surrounding country. Having established good shelter belts it is an easy matter to have vegetable gardens, poultry runs, shrubbery and small fruits. The shrubbery may be used as a background for perennial borders which should be set out in graceful curving lines instead of the stiff, straight-line fashion which so frequently mars an expensive piece of planting. What you saw yesterday should convince you that many beautiful effects may be secured by a proper grouping of trees and shrubs around the house and outbuildings.

For a farm of 160 acres some four or five acres devoted to planting is usually sufficient to be of practical utility and to produce most pleasing effects, and certainly enhances the value of the property, to say nothing of the pleasure of having an attractive place to live in and invite your friends to.

Regarding the practical arrangements of laying out a plantation, I do not intend to say anything as that depends largely upon the topography of the area to be covered. In several cases I have helped Manitoba farmers to select the sites of their future homes, and planned their plantations before they broke the ground for the erection of their buildings. Usually, however, the buildings are up before they think of planting, and it is not always easy to get the ideal arrangement, especially where the home is on a high knoll to command a good view of the surrounding country. In such cases narrow windbreaks may be placed close to the house and broader ones down the slope for the enclosure of vegetable gardens, fruit trees, &c.

SPACING.

The proper spacing of the trees in the shelter belt or wood-lot is a matter of the greatest importance, because it is desirable to have them completely shading the ground as soon as possible and at the same time facilitate the operation of cultivation between the rows so as to keep down the weeds and conserve the soil moisture. Usually they are placed four feet apart each way, which requires 2,722 trees per acre, but in some cases it is advisable to have them in rows six or eight feet apart and three feet apart in the rows, and in still others three feet apart each way, which requires 4,840 trees per acre. The main thing is to have them close enough to completely shade the ground in two or three years, and enough rows in the belt to form a considerable barrier against the stormy winds that blow in 'The good old winter time.'

Fall planting has not proved a success, and in the case of spring planting it should be done before the little trees begin to leaf out, else they are likely to shrivel up and die.

CULTIVATION.

If weeds are allowed to thrive in the young plantation you simply have a hundred or more husky weed competitors pumping up the soil moisture that should go to each of the little trees, and the result is that it is both smothered and starved to death. The laws of nature are inexorable, and it therefore behooves us to first discover them and then comply with them if we hope to attain any degree of success in the growing of trees, or anything else for that matter. Cultivation between the rows is best done shortly after a rainfall, and serves the double purpose of retaining the moisture and destroying weed competitors. It must not be continued too late in the season (usually the first or second week in August), however, or the young wood will not have a chance to mature and is apt to winter-kill. The planting of field crops between the rows is unwise. We do not live in Ontario but in Alberta.

PRUNING.

It is simply astonishing how many people want to prune the trees in a shelter belt when it is neither necessary nor advisable. Pruning gives the wind a chance to sweep through the belt of trees and thus defeats the object of establishing it. Besides this, it is generally so badly done that the trees are marred by unsightly stubs sticking out for years or become badly infected by fungous diseases. If they have been properly spaced they will attain a good high growth and do their own pruning.

PROTECTION.

It need scarcely be pointed out that the plantation should be fenced to protect it from cattle and have a fireguard around it to protect it from fire. I have known quite a few plantations to be destroyed because these precautions were not taken. In the case of rabbits it may even be necessary to smear the stems with disagreeable substances like tar or wrap them with burlap. Whenever gaps occur they should be filled up as soon as possible so as to keep the whole plantation moving forward together and thus prevent the entrance of weeds and grass.

NEGLECTED PLANTATIONS.

When couch grass and blue-joint grass make their appearance they should be carefully forked out and burned. In some cases the weeds which have taken possession may be smothered out by mulching with straw or manure. When straw is used it should be applied about the beginning of June, when growth is most active, and should be about 18 inches deep so as to make sure of its doing effective work.

EVERGREENS.

Conifers like spruce, tamarack and pine are the most difficult to grow because they require close watching in the seedling stage and are difficult to transplant. In this operation especial care must be taken to prevent the drying out of their tiny

rootlets, especially in dry or windy weather. For this reason the roots are generally kept in a 'puddle' of clay and water about the thickness of cream until they are set in the ground. In all cases they should be well 'firmed in.' This is best done with the heel, and in some cases it is advisable to have a loose layer of an inch or two at the top to act as a dust blanket. Everyone wants the evergreens, because of their beauty and dense foliage, both summer and winter. Like many of the best things in this world though, they are the hardest to obtain and the most difficult to manage. If willow or poplar hedges have already been established the problem becomes very much simplified.

IRRIGATION.

In irrigated districts where the farms are small and intensive methods are in vogue the land will be too valuable to devote much of it to shelter belts, in which case narrower belts will suffice because the water will ensure the trees getting a good



One of the Lethbridge canals.

start. In applying it much care should be exercised as the tendency is to use more water than necessary, and this practice has the effect of causing the root system to develop too near the surface of the ground and thus render the trees susceptible to drought when irrigation ceases. This reminds us of people who have been pampered in early youth and are then suddenly left to 'root' for themselves.

WHAT HAS BEEN DONE.

In 1901 the Dominion Forestry Branch of the Department of the Interior began growing trees on a large scale for free distribution among the settlers on the plains, and in 1908 the Canadian Pacific Railway began growing them for planting along

their right of way to replace the portable snow fences between Winnipeg and Calgary. So far the Dominion Forestry Branch has sent out between fourteen and fifteen millions of seedlings and cuttings and the Canadian Pacific Railway about one and one-half millions. In both cases fully ninety-five per cent of them are growing, the remaining five per cent being lost because of poorly prepared soil, poor planting or neglect to cultivate between the rows.

WHAT MIGHT BE DONE.

It sounds pretty big to tell you that sixteen and one-half millions of trees have been set out on the plains, but when it is remembered that most of them are four feet apart each way it will be seen that if they were planted in a solid block they would occupy considerably less than seven and a half square miles, which sounds rather insignificant. I merely mention this to show you what a small portion of the desirable work of planting windbreaks and ornamental hedges has been accomplished. Nevertheless enough has been done under all sorts of conditions to clearly demonstrate the possibility of beautifying the farm by the planting of trees.

ENCOURAGEMENT HELD BY THE CANADIAN PACIFIC RAILWAY.

Last year the Forestry Branch of the Canadian Pacific Railway Department of Natural Resources undertook an educational campaign, and offered prizes aggregating \$2,500 for the best kept tree plantations on lands purchased from the company. Contestants must be bona fide settlers living south of township 29 in the province of Alberta. This offer shows that the Canadian Pacific Railway is very much interested in having the prairie farmers beautify their homes by the establishment of tree plantations on their places. Free information and advice are given regarding the best methods of preparing the land, the choice of species, spacing, care of the trees, &c., and many outsiders are inquiring for this information. The newspapers are enthusiastic in their praise of the company's enterprise, and quite a number of farmers have signified their intention of competing.

FIFTY YEARS HENCE.

Gentlemen, I think it was Thos. Carlyle who said, 'God pity the time, the place, or the country whose young men do not dream dreams and whose old men do not see visions.'

Would it, therefore, sound like presumption on my part to state that it is my intention to return to the Lethbridge district exactly fifty years from this date, when I fully expect to find hundreds of miles of beautiful shelter belts established about the homes of your numerous, prosperous, contented and cultured descendants. If, on the 7th of August, 1963, I am no longer an inhabitant of this terrestrial ball, I shall do my utmost to check out my astral body and come back anyway.

Long before that date arrives vast stretches of the southern portion of this beautiful province will have been placed under irrigation, Mr. McMullen's dream of mixed farming will have been fully realized, Dr. Rutherford's prophesy of the agri-

culturist being restored to his proper position of 'king' will have come true, and looking out over the beautiful landscape your people will be able to quote Sir Walter Scott and say with fervency and zeal,—

‘Breathes there a man with soul so dead,
Who ne’er unto himself hath said,
“This is my own, my native land.”’

(Applause.)

Mr. FAIRFIELD.—Is there anyone desires to discuss this paper?

Mr. HUCKVALE.—I was very much interested in what Mr. Ross said about the effect of shelter belts in preventing the drying out of moisture through warm winds. In 1908, on the 29th of July, we had in our part of the country a very hot wind that dried up everything that was growing between Medicine Hat and the boundary line except a few late oats we had. I always thought they kept green by reason of some water supplied them early in the month, but there was a shelter belt of trees to the south and west of them and it is evident from what Mr. Ross has said, the trees protected the oats. A gentleman from North Dakota also was talking to me along the lines of what Mr. Ross has said. This gentleman also went on to say that the effect of wind on the soil had not been studied as it might have been, and that Mr. Angus MacKay, of Indian Head, was the man he considered had given the most useful information to the world on that question. I thought it was a great compliment. (Applause.)

Mr. CAMPBELL.—I think one of the chief values of the shelter belt is the great variety of things that can be grown on each side of the shelter. It was thought at one time it was impossible to grow fruits of any kind on the western prairies, but after shelter belts were established it was found possible to grow almost any kind of fruit. I have no doubt that by a proper selection of species, practically every part of the prairie country will be able to produce large quantities of fruit. I think the ladies, particularly, on the farms will recognize that the lack of fruit is one of the great difficulties they have to meet.

Mr. ROSS.—I devoted too much of my paper perhaps to the typical methods of setting out trees. I am very glad indeed that Mr. Campbell commented on that phase of the question.

Mr. FAIRFIELD.—I can second what the gentlemen have said, particularly about the possibility of raising fruit on the plains by the use of windbreaks. It is indeed very difficult, if not impossible, to get satisfactory results without these windbreaks.

Mr. FAIRFIELD.—The secretary has a number of communications to read at this point.

Mr. RANKIN.—I have received from the International Engineering Congress, established in New York, an invitation to the officers and members of this association to participate in the proceedings of the International Engineering Congress to be held in connection with the Panama-Pacific International Exposition, September 20 to 25, 1915, in San Francisco, California. I am asked to send a list of the

delegates of this convention so that literature may be sent to them by the Engineering Congress. If you should happen to be in San Francisco at the time of the Exposition, it will probably be of interest to you to know of this.

The following additional communications have also been received:—

VICTORIA, June 10, 1913.

DEAR SIR,—Allow me through you to thank the executive of your association for the kind invitation to attend the annual convention to be held in Lethbridge in August next.

I appreciate the importance of such a gathering very highly, but regret exceedingly that my engagements will not permit me to attend, much as I should like to do so.

Yours very truly,

RICHARD McBRIDE.

MINISTER'S OFFICE,

OTTAWA, June 10, 1913.

DEAR SIR,—I have your letter of the 6th instant advising me that the Seventh Annual Convention of the Western Canada Irrigation Association is to be held at Lethbridge, August 5, 6 and 7, and extending to me an invitation to be present.

I should very much like to be present at the convention, but I expect to have to leave very shortly for Belgium and England, in which case, of course, I should be absent from Canada at the time of the convention. Will you kindly convey to the members of the executive my thanks for their kindness in inviting me to be present and also my best wishes for the success of the meeting.

Yours faithfully,

M. BURRELL.

(Telegram.)

REGINA, SASK., August 1, 1913.

Regret Mr. Motherwell unable to attend your convention. Will be represented by our Mr. Thomson.

I. G. CUMMINGS,

Secretary.

TWENTIETH NATIONAL IRRIGATION CONGRESS,

SALT LAKE CITY (SPOKANE, WASH.), August 2, 1913.

MY DEAR MR. RANKIN,—It was with the greatest regret that I wired you to-day that developments here will prevent my attendance at your Lethbridge irrigation convention. As I told you when you were here, I thought I could arrange to be present, and I was so planning, but matters have come up here which I now see will make it impossible for me to get away at this time.

I delayed acknowledging your kind invitation of July 26, hoping that I would be able to arrange to attend.

This uncertainty also delayed an acknowledgment of the letter from Mr. Finley. Will you kindly show him this, so that he will understand my failure to supply his requests for cuts, &c., which I did not wish to send with the possibility that I would be prevented from attending.

With best wishes for a most successful convention, I remain, regretting that I cannot be with you.

Very truly yours,

ARTHUR HOOKER,

Secretary.

UNITED STATES DEPARTMENT OF AGRICULTURE,

BOISE, IDAHO, July 25, 1913.

MY DEAR MR. RANKIN,—Such unexpected complications have arisen in connection with my work in Idaho that I find it will be absolutely impossible for me to attend your convention on August 5, 6 and 7, much as I would like to do so.

I therefore beg to be excused, trusting that my inability to attend will not seriously discommode you and that it will not interfere with my meeting with your convention at some later date. I do not know when anything has ever come up before that I have hated so much, as the necessity of passing up this meeting, but it seems absolutely out of the question for me to attend, as I have a large number of men working under me and this is the busy time of the year.

Thanking you very kindly for your courtesy in regard to this matter, I am,

Very sincerely,

DON. H. BARK,

Irrigation Engineer in charge of investigations in Idaho.

(Telegram.)

LOS ANGELES, CALIFORNIA, July 24, 1913.

Mr. W. H. Holabird, General Manager of the California Development Company, regrets very much indeed that a severe illness has prevented the preparation of the paper to be read before your convention at Lethbridge on August 5, and will prevent his attendance upon the convention.

FRANCIS MARSHALL,

Secretary.

(Telegram.)

PORTLAND, OREGON, August 4, 1913.

Please express to the association my sincere regrets at not being able to attend the meeting. The *Timberman* neglects no opportunity to preach the gospel of irrigation, realizing it to be the solution of the problem of building up the vast stretches of arid and semi-arid land both in Canada and the United States, only needing the magic touch of water to make them blossom like the rose and draw away the surplus thousands of people from the increasingly congested centres of population. May your meeting be as profitable as the importance and beneficency of the cause deserve that it should be.

GEORGE M. CORNWALL,

Editor.

(Telegram.)

SAN FRANCISCO, CALIFORNIA, July 31, 1913.

With many regrets, I find I cannot attend your convention.

P. E. QUINN.

(Telegram.)

GOODEVE, SASKATCHEWAN, July 30, 1913.

Dr. Allison Smith sick in bed. Impossible attend Lethbridge meeting.

ALLISON SMITH,

per W. LALLERDAY.

(Telegram.)

KAMLOOPS, B.C., August 4, 1913.

Regret cannot attend this year's convention. First I have missed. Best wishes for successful meeting.

FREDERICK J. FULTON.

(Telegram.)

KELOWNA, B.C., August 4, 1913.

Municipal Council of City of Kelowna extends hearty wishes for a successful convention.

G. H. DUNN,
City Clerk.

Mr. FAIRFIELD.—I wish to call the attention of the delegates to the reception to be held this evening at 8.30 at the parlours of the Lethbridge Hotel. Now I believe that a motion for adjournment is in order.

Mr. LAWRENCE.—Allow me to read a dozen words from the last report, before that is put, with regard to something that has not been done. Page 105, Resolution No. 10:—

‘Whereas the consummation of the work of this association in British Columbia requires special attention and effort in accordance with the conditions of the province;

‘Be it resolved, that a committee of British Columbia delegates, with a local secretary, be appointed to deal with irrigation, dry farming and forestry subjects, keeping in touch with the Agricultural and Forestry Departments of the Federal and Provincial Governments, and the permanent secretary and executive of the association at Calgary.’

It was carried unanimously, and I should like to know whether anything was done to appoint that committee and secretary, and if not, why not?

Mr. RANKIN.—That, Mr. Lawrence, referred in my opinion to the meeting of British Columbia delegates which was to be held in Victoria, and was held there on January 9. As you remember, Dr. Dickson was appointed by the committee and attended there and carried out the work of keeping in touch with the delegates as much as possible. The file dealing with that was left at the entrance, but I have not it with me now, but will be glad to show it to you on returning to the hotel.

Mr. LAWRENCE.—I am sorry to differ with Mr. Rankin, because towards the end of the convention I asked the question whether the president would appoint that committee. He said the committee would be left to the executive to appoint at their next meeting.

Mr. RANKIN.—The executive thought that in appointing Dr. Dickson at that time they were carrying out the wishes of the mover and seconder of the resolution.

Mr. LAWRENCE.—That does not meet the resolution. A committee and secretary were to be appointed. Perhaps it would make the matter clearer if I read further from the report of last year. I may say that this resolution was drafted by some of the British Columbia delegates and it was left to me to ask Mr. Dennis if he would present it, and in his consideration he did present it. This is what I said:—

‘That resolution was formed as the result of conversations with a good many of the British Columbia delegates present, and we think it would be a very great assistance to the executive and to the secretary located in Calgary. Undoubtedly there are conditions in semi-arid districts in British Columbia which present

peculiar features which do not obtain in Alberta, and if there has been no particular expression on those lines so far, it was simply because we did not want you to think that we are not satisfied with the management, or dissatisfied with the attention you are giving to matters in this province, or that we wished in any way or shape to get the thin end of the wedge in order to make a cleavage. That is farthest from our thought; but we do think in this large province, with its peculiar conditions, it is necessary to have an executive such as is outlined in that resolution, so that the responsibility of that kind of work should be laid upon a committee in this province, acting in conjunction with our able secretary."

Mr. FAIRFIELD.—As far as I know, this committee was not appointed. Dr. Dickson was appointed to meet with the executive, which he did, I understand, at Victoria. It was not possible for me to be present at that meeting, but the report, our secretary says, is within his file and he left it open for anyone of the delegates interested in investigating. Now this committee apparently has not been appointed, but on account of the lateness of the hour now, it seems to me it would be better, Mr. Lawrence, if you would write a letter to the new executive and call their attention to this fact, so that they may take the matter up. I judge that would be the best way.

Mr. LAWRENCE.—I will act on any suggestion you may make.

Mr. FAIRFIELD.—I believe that would be the best way. I am sorry you did not take it up early in the convention, as some of the delegates and officers have left now.

Mr. LAWRENCE.—You see I did not want to mar the proceedings, the unanimity with which we have done things. I did not want to introduce anything contentious, so I waited simply to ask for an explanation.

Mr. FAIRFIELD.—I think, Mr. Lawrence, it would be well for you to write to the executive.

Mr. LAWRENCE.—Yes.

Mr. BROWN.—Just because we have a permanent secretary, I don't think that is any reason why we should not show our appreciation of the work he has done, and I wish to propose a hearty vote of thanks to Mr. Rankin for his untiring energy and perseverance in making this convention such a success.

Mr. CURRY.—I have great pleasure in seconding that.

Mr. FAIRFIELD.—It affords me a great deal of pleasure to put this motion. Carried unanimously.

Mr. RANKIN.—Gentlemen, I thank you very heartily for your kind motion on my behalf. It is never difficult to make a success of a meeting of this kind when one has good lieutenants, as I said last year at Kelowna when I had the assistance of Dr. Dickson, and I say it again to-day, now that I have the able assistance of Mr. Finley. I wish the world was full of Dicksons and Finleys whenever there is a convention. I hope always to make the programme of this association as attractive as possible in every way. (Applause.)

Mr. E. FOLEY-BENNETT.—What has been done with regard to the date of the next convention?

Mr. FAIRFIELD.—That is usually left with the new executive, for the reason that the local men where the convention is to be held like to consider the most advantageous time for holding the convention.

Motion for adjournment is in order.

Moved by Mr. Curry, seconded by Mr. Smith, that the convention now adjourn. Carried.

At 8.30 in the evening a reception to foreign delegates, officers and speakers was tendered by the Mayor and City Council and the Board of Trade, at the Lethbridge Hotel parlours, and at 9.15 an invitation banquet was given to foreign delegates, officers and speakers, by the Lethbridge Board of Trade, at the Lethbridge Hotel. Mr. Fred. W. Downer acted as toastmaster, and short speeches were delivered by the following: Mayor W. D. L. Hardie, W. C. Ives, Dr. J. G. Stewart, Mr. Robert Needham, William Young, William Pearce, F. H. Peters, J. W. Arthur Kelly, Professor R. H. Lyman, W. A. Buchanan, M.P., W. G. McMullen, C. E. Lawrence and E. Foley-Bennett.

The secretary also spoke at this banquet, and his remarks are reproduced as follows, because they have an important bearing on the work of the association:—

MR. PRESIDENT AND GENTLEMEN.—I am delighted to have this opportunity of saying a few words to you before this convention becomes a thing of history, and to publicly express to Mayor Hardie, President Ives, Mr. Downer, the members of the City Council and Board of Trade, our sincere appreciation of the splendid entertainment and cordial reception given us and the able manner in which you have done it. You have indeed earned the undisputed right to the title, 'The Convention City,' and I am sure I but voice the sentiments of every delegate here when I say that we will go our several homeward ways with forever a warm spot in our hearts for your city and a still warmer spot for some of the good fellows whom we have met here.

It is not difficult to make a success of a convention when one has the kind of assistance that has been given to us here, and I take great pleasure at this time in giving credit and honour where credit and honour are due, and in saying to you that I think Local Secretary Finley has done splendid work and has been the moving spirit behind a very active local board. I speak from the heart when I say that you could not have done more to entertain us if you had tried; you have left nothing undone, left nothing to be desired, and I will even go further and say that all the papers have been interesting and instructive, and I believe no one will regret having attended, and that you will all carry away with you a little more knowledge, a little more information in regard to the proper use of water than you had before you came.

I must confess to you, however, as I have confessed to myself, that this convention has not been the success that I hoped and expected it would be in attracting the farmer. It is all very well for us to meet to pass resolutions, listen to interest-

ing papers and join in banquets and entertainments, disperse for another year to meet at some other point. That is enjoyable indeed, but that is not the purpose of this association; our purpose is to interest, instruct and assist the farmer, and if the means we have hitherto employed to get the farmer to come and to help him through our meetings have not been so successful as they should be, we must devise some means that will bring him, or we must go out of business altogether. That is a perfectly clear and inevitable conclusion.

I speak now of our prairie conventions, not of those held in British Columbia, because those of you who attended the Kelowna meeting last year know that that convention was a decided success, that it drew the men we wanted to reach, the man behind the plough, the fruit grower and the farmer. It is, however, a different class of men to whom we appeal in British Columbia, and our problem is not with them, it is with the farmers on the prairies. In spite of the fact that a strong and more carefully thought-out publicity campaign has been indulged in this year, that over a thousand more invitations were issued than last year, and that these were followed up week by week with postcard notifications to jog the farmers' memories, and that magazines and newspapers and periodicals carried stories of the forthcoming convention, and the wires were kept hot with irrigation notices, we did not get many of them. They did not come. Why? Now what is the matter? What is wrong? What is the remedy? These are the questions that have been passing through my head in the past twenty-four hours. Is not the farmer in Alberta or Saskatchewan interested in irrigation? You will admit, I am sure, that he most emphatically is. Is not the country filled with farmers anxious for advancement and instruction? Mr. Fairfield and others will tell you that it is. Granted then that this is so, my conclusion then is that this convention—these prairie conventions—are held at the wrong time of the year—a time when even though the farmer wants to come, is anxious to come, he cannot, because he is busy in his fields, busy in getting in his crops.

It is either for this cause that he stays away, and I am convinced that this is the reason, or because he does not read the daily papers, official calls and notices that are sent to him. The time when the farmer is least busy, the time when he can absent himself from the farm for a little amusement and instruction without cutting into his revenue or valuable working hours, is the time to hold our conventions.

I bring up this subject to-night, Mr. President and gentlemen, with apologies to you all. It is perhaps not the proper time nor the place for it, but I have not yet had an opportunity to speak of it, and I want to bring the question before you for your consideration before you go away, and make it clear to you that it will be the work of the incoming executive to study this question seriously, resolve what is best to do and how to do it, and make this association, what it is intended to be, of practical use and benefit to the farmer.

If I am wrong in my belief that the time is not propitious to the man on the land, the lack of personal campaign or something of that sort, why, the executive will find it out, and once this is done, we may expect to see our conventions attended by three, four or five times as many delegates as have come to this convention, all so busily engaged in solving the problems of the land that daily confront the farmer, that we will barely have time to dismiss sessions to eat,

much less enjoy a sumptuous banquet such as we are tendered by you here to-night. The mixed farming convention held in this city in the spring was poorly attended in my opinion, not because the farmers did not want to come, not because they did not realize the value of that convention, but because it also was held at what I consider the wrong time, and if we can but suit the time to the farmers, the farmers to the time, the chief difficulty hitherto met will disappear.

In conclusion, gentlemen, I want to again reiterate our appreciation of your kindness and courtesy, and say to you that the convention in Lethbridge will remain in our thoughts for a long time to come, and the enjoyable entertainment which you have provided will not soon leave our memories. (Applause.)





LETHBRIDGE PARK, LETHBRIDGE.

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